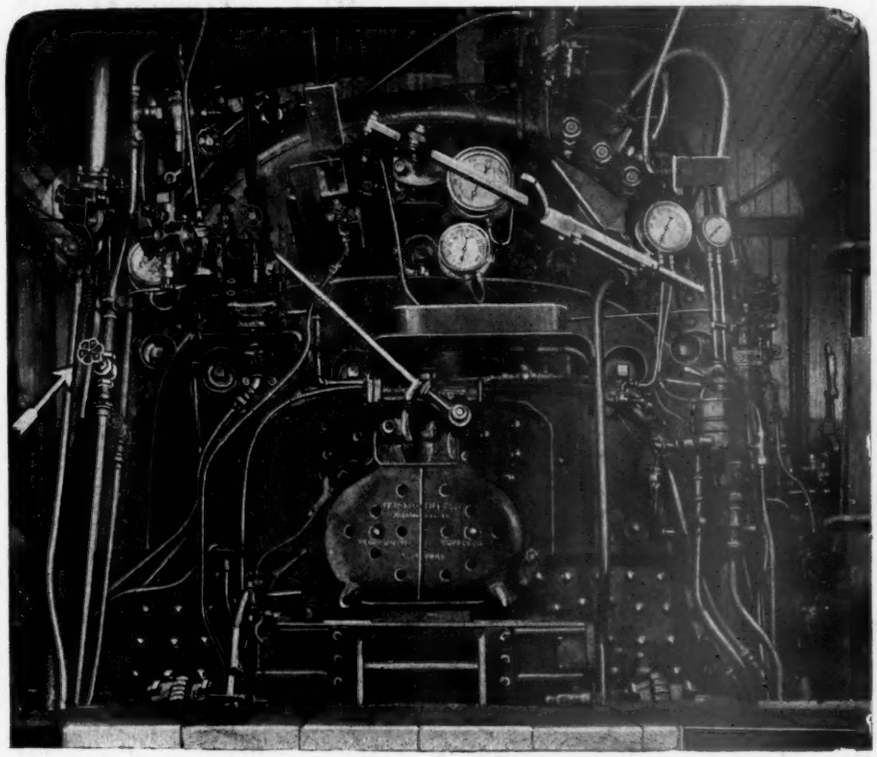
MAY 23 1921

UNIV. OF MICH

Railway Age

FIRST HALF OF 1921—NO. 20 NEW YORK—MAY 20, 1921—CHICAGO SIXTY-SIXTH YEAR

Published weekly by Simmons-Boardman Pub. Co., Woolworth Bldg., New York, N. Y. Subscription Price U. S., Canada and Mexico, $8.00; foreign countries (excepting daily editions), $10.00; single copies, 25c. Entered as second-class matter, January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.



Elvin Mechanical Stokers

take up a small amount of cab room and lend themselves to easy arrangement of automatic fire doors, power grate shakers and other backhead apparatus.

The arrow shows the stoker throttle which with the coal feed lever on the tender constitute the only controls required to operate the Elvin Stoker.

They reduce the weight carried by the trailer. The stoker unit weighs but 2900 lbs. and the tender unit but 2400 lbs.

Simplicity of operation, ease and low cost of application, extraordinary low maintenance and fuel costs make the Elvin the ultimate locomotive stoker.

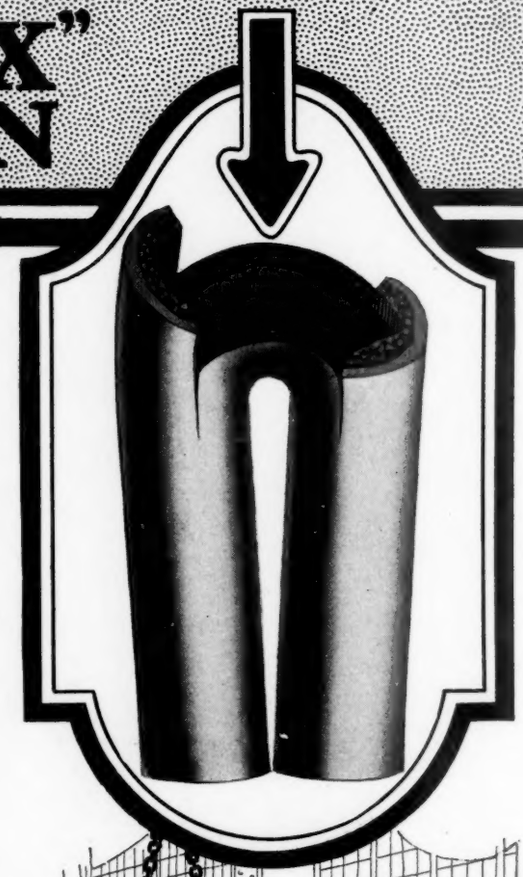
Why not investigate? Write today.

The Elvin Mechanical Stoker Company

50 Church Street New York City

Alphabetical Index to Advertisements, Page 89a Classified Directory of Advertisers, Page 85

The Nick and Bend Test
applied to "H.B." and "AJAX" IRON CHAIN



"The Nick and Bend Test" illustrated here, exemplifies the internal fibrous and uniform structure of "H.B." and "Ajax" Iron Chain and is further evidence that every link will hold for the purpose intended.

"H.B." and "Ajax" Chains are both exceptionally high grade products, possessing distinct differences in material and dimensions of links to meet the special requirements of the users. Both possess these essential qualities:

Hardness sufficient to withstand abrasion when used upon Dredges and Steam Shovels;

Ductility that will absorb shock loads when used upon Wrecking Units; and

Tensile Strength sufficient to carry—with the highest factor of safety—heavy loads imposed when employed with Cranes, Hoists, Slings or for other severe and exacting usage where absolute

Dependability is required.

The letters "H.B." or the word "Ajax" stamped every six feet on a Dredge or Heavy Duty Chain is positive assurance of *proof-tested* and *guaranteed* dependability in quality and service.

American Chain Co., Inc.

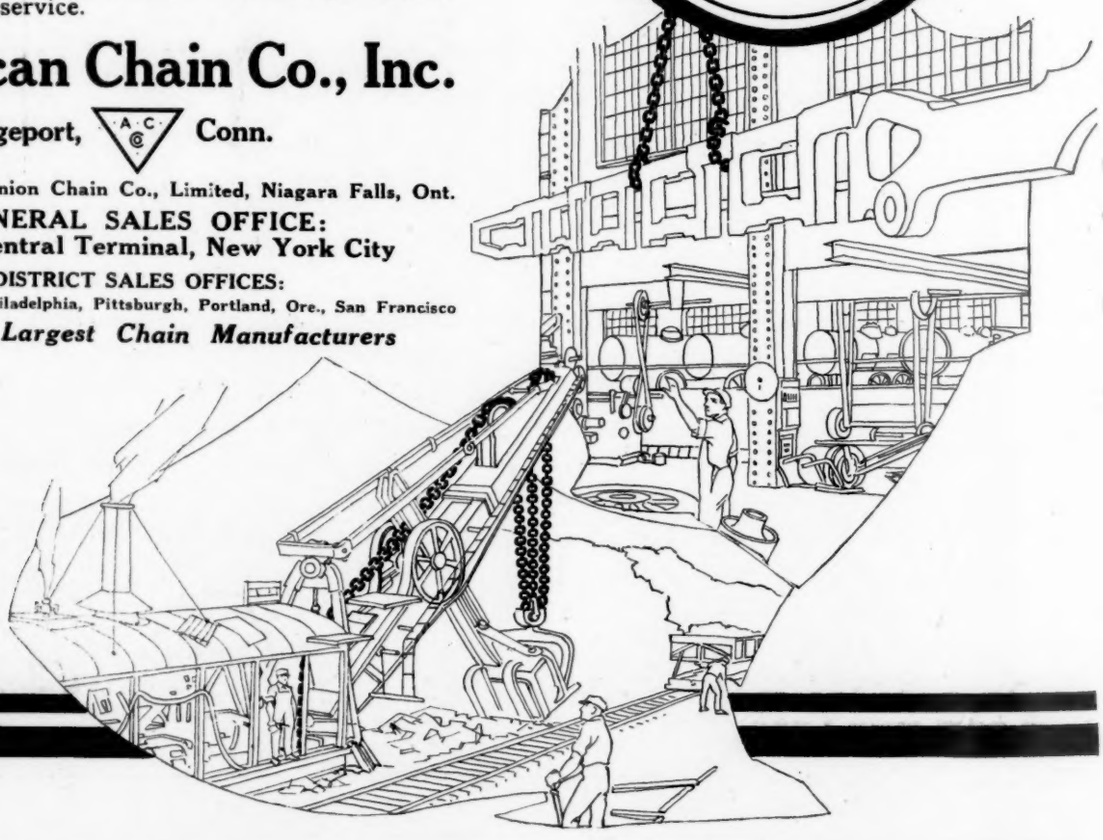
Bridgeport, A·C Conn.

In Canada: Dominion Chain Co., Limited, Niagara Falls, Ont.

GENERAL SALES OFFICE:
Grand Central Terminal, New York City

DISTRICT SALES OFFICES:
Boston, Chicago, Philadelphia, Pittsburgh, Portland, Ore., San Francisco

World's Largest Chain Manufacturers



EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

One of the most extravagant conditions which any industry can face is a high labor turnover. While this is particularly true in those classes of employment where a high degree of skill and experience are required, its effect is also evident in the less skilled and so-called unskilled industries. The constant changing of men has been the greatest handicap which has been imposed upon maintenance of way work, particularly track work, as many as 20 men frequently being hired in a single season to keep one man at work. Conditions such as those which existed during the war, when our entire industrial life was thrown into a turmoil, cannot be avoided. However, the exceptionally high turnover in maintenance of way work has existed for so long, irrespective of conditions in outside industries, that many officers regard it as inherent to the work and a condition which must be reckoned with rather than eliminated. That it can be largely reduced is open to demonstration. Other industries employing similar classes of men have stabilized their forces and greatly increased the production per man. If they can do it, the railways can do as much. The present offers an opportunity for the study of this problem and the inauguration of plans for the elimination of those defects in our present system which are contributing to this constant changing of forces. There is now a surplus of labor. Men who desire permanent employment are available. Therefore, the railways have an opportunity to secure and develop forces which can be made permanent. To do this they must learn what conditions are tending towards short tenure of service, and remove them. This may require some radical changes in the railways' methods of work but the great saving which can be effected by reducing this turnover to that prevailing in other industries can be realized when it is considered that the maintenance of way department payroll is now in excess of three-quarters of a billion dollars annually.

What Is Your Labor Turnover?

One of the disputed points in concrete practice relates to the effect of water on the life of a structure. Waterproofing is generally applied to keep water out of basements, pits, tunnels or other subterranean or subaqueous constructions subject to hydrostatic pressure, as well as to railway decks which serve also as the roof over occupied spaces or passageways. But in most of these cases, the prime reason for keeping out the water is because it interferes with the occupancy of the structure, while the question of the deterioration of the concrete is secondary. A rather wide difference of opinion exists as to the necessity for waterproofing in cases where the only object is the protection afforded to the structure itself. On eastern roads having a larger proportion of permanent structures and where the tendency has been more largely toward heavy massive design, the use of waterproofing as a protection to the concrete is quite general while in the west the practice is more varied. While it is generally conceded that steel imbedded in a concrete of reasonable density is not corroded by the circulation of water through the pores in the surrounding material, the possibilities of electrolytic action or the presence of corrosive gases introduces a specific hazard in some cases. Another uncertainty is introduced through the possibility of injury by frost action, especially at construction or expansion joints. It is not the purpose here to suggest what the correct practice should be, but when two parallel roads follow practices that are entirely different in this regard, it should be clear that one or both of them is following precedents rather than conclusions founded on thorough study. If the facts are not now available for a scientific conclusion, it is high time that such investigations be made.

Should Concrete Be Waterproof?

"Commerce Reports" is the name of a daily publication issued by the Bureau of Foreign and Domestic Commerce at Washington. The purpose of this publication supposedly is the dissemination of information of interest and value to those who are seeking to further America's foreign commerce. Probably the most important of any of the information published in this journal is the announcements of projects which are being undertaken in foreign countries which may afford opportunities for the sale of American goods. It might naturally be supposed that the Bureau would be glad to have information of this character copied by business papers and given general circulation. Such, however, is apparently not the case. In "Commerce Reports" of May 11 it is reported that a certain railway in Brazil is contemplating the construction of a bridge to cost $1,000,000 and that the name of the railroad can be obtained on request by reference to a certain file number. The New York office of the Bureau, however, would not give the name of the road to the *Railway Age* without a promise in writing that the information would not be printed. In other words, the fact that a project is to be undertaken which will afford an important opportunity for American builders who are seeking foreign contracts is to be kept from all except those who have the patience and the time to read "Commerce Reports" every day. Herbert Hoover, the new Secretary of Commerce, has apparently been endeavoring to rid his department of useless red tape and put it on a basis of co-operation with business and the business press. The *Railway Age* is heartily in accord with such a movement and believes that Mr. Hoover can do American business a real service by instructing his subordinates in the Bureau of Foreign and Domestic Commerce that their business is the dissemination of information and not its concealment.

More Red Tape

The American Railway Development Association, whose annual meeting is reported in another column, is unique among railroad associations, in that its purposes and activities are wholly outside the railroad field; and they extend in all directions. The members work to develop, not railroads, but everything else; everything which will stimulate railroad traffic, provided a suitable opening can be found. This meeting was devoted mainly to farming, and the discussions ranged from seed potatoes to the construction of tasteful cottages. Among

Promoting the Prosperity of Farmers

the wealth of practical ideas, those presented by E. F. Benson, of the Northern Pacific, were perhaps the most interesting in their novelty and bigness. His paper was very briefly reported last week. As everyone knows, the fundamental farm problem in America is to make intelligent and energetic people contented to live on farms; and Mr. Benson set forth with great force the essential elements required in dealing with it. Nothing less than hearty co-operation will turn the trick. The Community development association makes available to the individual the benefits of co-operative effort in scientific farming, comfortable home-making, education of children and all the principal elements of a contented life. Such associations should be fostered by the railroads from the plainest motives of self-interest. An association should be voluntary and mutual; but remarkable results have been accomplished in two states, California and Wisconsin, by what may be termed outside initiative. In California by legislative action, and in Wisconsin by a corporation, frankly organized for profit, the settlement of farms has been promoted on a large scale to the great satisfaction of all concerned. As Mr. Benson said, this may be called paternalism or cold business, or whatever you please; but the results challenge criticism. Every railroad officer interested in colonization, or in promoting the prosperity of farmers, will do well to get copies of the paper.

"Productive Efficiency" of Facilities and Employees

THE LABOR UNION LEADERS are telling the Railroad Labor Board and the public, and will soon be telling the Senate Committee on Interstate Commerce, that the financial troubles of the railways are due to wasteful management and not to the inefficiency and high wages of labor. Therefore, they contend, all the needed economies in operation can and should be secured by increased efficiency of management without reductions of the payroll.

These contentions are a challenge to a direct comparison between the efficiency of management and the efficiency of labor. The operation of the railroads is carried on under the direction of their directors and officers. Their operations are conducted partly by means of human agencies, namely, the employees, who furnish their labor, and partly by means of physical instrumentalities, namely, the tracks, locomotives, cars and other parts of the plant, which are provided by the invested capital of the owners. The only thing produced by the railroads is transportation. Their most important product is freight transportation, their earnings from the transportation of freight being over 70 per cent of their total earnings. All improvements in plant and methods having as their ultimate object the increase of efficiency and economy of operation are designed and intended to secure this object by increasing the amount of traffic handled per each physical unit and per employee. Since the payroll now constitutes about two-thirds of all operating expenses, it is especially essential to the maintenance and increase of the economy of operation that the amount of traffic handled per employee shall continuously increase. It happens, however, that while the track, the locomotive, the car, being inanimate things, can offer no resistance to the efforts of the officers to increase their productive efficiency, the employees, being human beings, can, by securing unreasonable rules and working conditions and by other means, largely defeat the efforts of the managers to increase their productive efficiency.

Having in mind these facts, some interesting and significant comparisons may be made between the changes which have taken place within recent years in the average amount of traffic handled per unit of physical plant and per employee. The accompanying table gives the number of tons carried one mile (1) per mile of line, (2) per freight locomotive, (3) per freight car, and (4) per employee in the years 1913, 1917 and 1920.

TONS CARRIED ONE MILE

	Per mile of line	Per freight locomotive	Per freight car	Per employee
1913.....	1,335,410	8,650,446	148,474	187,877
1917.....	1,698,825	11,282,617	173,552	250,997
1920.....	1,747,948	11,682,068	190,951	221,921

Each of these years was a year of maximum traffic—that is, one in which the amount of traffic handled was larger than in any previous year. It will be seen that in 1917 as compared with 1913, and in 1920 as compared with both 1917 and 1913, there was a large increase in the amount of freight traffic handled per each mile of line, each freight locomotive and each freight car. It will also be seen that between 1913 and 1917 there was a large increase in the amount of freight traffic handled per employee. While, however, between 1917 and 1920 the amount of freight handled with each unit of the physical facilities increased, the amount of freight handled per employee showed a sharp decline.

The railways were under private management in 1917 and again in 1920. Was this decline in the amount of traffic handled per employee in 1920 due to shortcomings of private management? On the contrary, it is easy to demonstrate that it was due to the aftermath of government operation. In 1917, under private operation, as the table shows, the number of tons carried one mile per employee was 250,997. This figure was the result of a steady increase in the output per employee which had been going on over a long period of years, and was the maximum figure ever reached. In 1918, under government operation, the tons carried one mile per employee declined to 241,541. This decrease in output per employee was entirely due to a large increase in the number of employees, since the total amount of freight handled by the railways in 1918 was slightly larger than in 1917. In 1919, the second year of government operation, while the total amount of freight traffic carried by the railways declined over 10 per cent, the number of employees actually increased over 70,000. The result was that the number of tons carried one mile per employee declined further to 208,026. While, therefore, the amount of freight handled per employee in 1920, under private management, was less than in 1917, under private management, it was greater than in 1919, under government operation.

The facts are, then, that the tracks, locomotives and cars of the railways, the methods of using which are almost entirely under the control of the officers, have steadily increased their output per unit. It is also a fact that the railway managements in 1920 secured a greater output from practically every other physical facility than ever was secured before. On the other hand, the average output of the employees abruptly declined under government control, and is still much less than it was in 1917.

The labor leaders say that the "productive efficiency" of the employees, measured in passenger miles and ton-miles, is greater than before the war. The figures show this is true, the output per employee being greater in 1920 than in 1913. When, however, the labor leaders appear before the Senate Committee the members of that committee may well inquire why in 1920 the productive efficiency of every physical facility of the railways was greater than ever before, while the productive efficiency of the employees in the years 1918, 1919 and 1920 was less than in 1917, or even in 1916.

The physical facilities of the railways have been provided by the owners. The owners are now getting practically no return upon their investment in these facilities, although the productive efficiency of the facilities in 1920 was greater than ever before. Since the productive efficiency of the facilities has shown a steady increase, while the productive efficiency of the employees has shown a decrease, the members of the

Senate Committee may well ask the labor leaders why those who have provided the facilities should continue to be denied as much return upon their capital as they received in 1916 and 1917, while the employees should, as the labor leaders contend, continue to be paid wages twice as high as they received in those years.

Forged Testimony Before the Labor Board

THE *Railway Age* has never opposed, or even criticised, the organization of labor. It believes labor has as much right to organize as capital. It has, however, criticised many things that labor organizations, and especially labor leaders, have said and done. Among other things it has criticised leaders of certain railway labor organizations for causing intolerable delays in the proceedings before the Railroad Labor Board by introducing testimony having no bearing whatever upon any question before the board, and having the obvious purposes of delaying action by the board and unjustly discrediting private management in the eyes of railway employees and the public.

While much of the testimony presented by the labor leaders to the board has been irrelevant, the facts regarding the introduction by them in the national agreements hearings of a letter purporting to have been written by I. W. Geer, general manager of the Southwestern Region of the Pennsylvania system, are disgraceful. The letter was introduced on March 22 by B. M. Jewell, president of the Railway Employees' Department of the American Federation of Labor, and Frank P. Walsh, counsel for the labor unions represented by Mr. Jewell, during the cross examination of General W. W. Atterbury, vice president of the Pennsylvania system. It purported to carry instructions from Mr. Geer to all supervisory officers to ascertain the position of employees on proposed reduction of wages, "resorting to defamation of all labor organizations if necessary." The letter was immediately challenged by officials of the Pennsylvania as fraudulent. In a hearing before the Labor Board last week Mr. Geer and other officers and employees of the Pennsylvania proved that it was a complete forgery—that no such letter had ever been written by Mr. Geer, or received by any of those to whom it purported to have been addressed.

The counsel for the labor unions was obliged to admit that the letter was "unauthentic." A lawyer who introduces testimony which is fraudulent either has knowledge or is ignorant of its fraudulency when he introduces it. Whatever may have been Mr. Walsh's knowledge or lack of knowledge of the character of the letter when he introduced it, it is significant that when the Labor Board by formal resolution asked that he "make known how and from whom this letter, evidently fictitious and fraudulent, came," he refused to do so. "As representing the labor organizations," he said, "I do not intend to pillorize the person from whom this information came to us."

In other words, instead of repudiating or exposing the person or persons who committed the forgery, the labor leaders and their counsel protected him or them.

The course of the labor leaders and their counsel in introducing a letter bearing upon its face plain indications of a fraudulent character, and then, after its true nature as a forgery had been established, refusing to disclose the identity of the forger or forgers, requires no comment from us. Every reader may safely be left to make his own comments and draw his own conclusions. A very large majority of the members of the railway labor organizations are truthful and honorable men and good citizens. It is unfortunate they are represented in important positions by men who will do what their representatives before the Labor Board did in this instance.

In this connection it is neither inappropriate nor unjust to point out that while this particular piece of "testimony" was a forgery designed not only unjustly to injure the railways, but to ruin the career of a railway officer, a large part of the other testimony which has been introduced by the labor leaders before the Labor Board is hardly more defensible. Practically all the testimony they have introduced regarding the alleged financial crookedness of the railway managements, the alleged crooked relations between railway officers and railway supply companies and the alleged deliberate wastefulness of railway managements is almost as baseless, dishonest and misleading as the forged letter attributed to Mr. Geer. In the long run the labor unions and the railway employees are injured, and not benefited, by being represented in the way they have been before the Labor Board in the national agreements case.

A Railroad a Composite Structure

A RAILROAD is an aggregation of facilities for the production of transportation. Among its important units are cars and locomotives and the tracks and structures over which they are moved. As in any well-organized machine, these facilities must be co-ordinated into a harmonious unit if the best results are to be obtained. No constituent part can be developed without regard for the others, but it must be designed to be combined with others to form a composite agency. Obviously, the owners of the railways will be served best when these agencies are so co-ordinated as to produce transportation at the minimum cost.

So much for the ideal. Since the earliest days of railroading there has existed a controversy between the engineering and the mechanical departments regarding the load-carrying capacity and the clearances which it is necessary to provide in bridges, these structures forming the limit on the size and weight of the locomotives which can be operated. It is recognized by both that the reductions in the cost of operation of American railways have been due primarily to increased train loads, which in turn have been made possible by larger and heavier locomotives. Since the mechanical department can install these locomotives only as the engineering department provides the tracks, bridges and other structures over and through which these must operate, the engineering department exercises a restriction on the activities of the designer of locomotives. The pressure which the mechanical department has continually placed upon the engineering department is illustrated in the article by M. H. Haig, mechanical engineer of the Atchison, Topeka & Santa Fe, which was published in the *Railway Age* of May 6, page 1073, in which he stated that if a locomotive is to give practically 100 per cent service "its design must not be restricted by personal opinion or by physical limitations of the road * * * The only governing factors should be the size of the train and the traffic of the territory." Taken literally, this would imply that the question of the cost of providing the facilities necessary to enable these locomotives to operate is not a consideration.

It is here that the viewpoints of the engineering and mechanical department officers differ. It is natural that the mechanical officer thinks primarily in terms of the efficiency of the locomotive. It is equally natural that the engineering officer thinks first in terms of the cost of the structure he builds. There is no argument regarding the safe load for any bridge or the safe clearance for a structure; these are matters capable of demonstration. The problem with which a railway management is confronted in harmonizing these conflicting viewpoints is that of determining at what point

the additional cost of providing the facilities necessary for the operation of larger locomotives exceeds the economies derived from this heavier power. The problem is not that of larger locomotives, or of stronger bridges. It is one of economics to determine that point at which fixed charges more than offset possible economies. Both engineering and mechanical officers can contribute to the solution of this problem by combining to study it as a broad problem of the railroad, rather than that of their individual departments.

Delaware & Hudson

THE DELAWARE & HUDSON is one of the few roads of the country which seems to have made marked progress in regaining the operating efficiency and earning power which characterized it prior to the advent of federal control. The road in 1920 did the largest business in its history. After taking into consideration the amounts necessary to make up the standard return for January and February and the guaranty for the guaranty period, the company had a net of $4,933,163, equal to 11.61 per cent on the capital stock, as compared with a net in 1919 of $4,605,004, equal to 10.83 per cent on the capital stock. The Delaware & Hudson is confronted with the national agreements and the high wage scales in like degree with any other railroad. If conditions in 1920 had been back to normal, the road would have had a remarkable year.

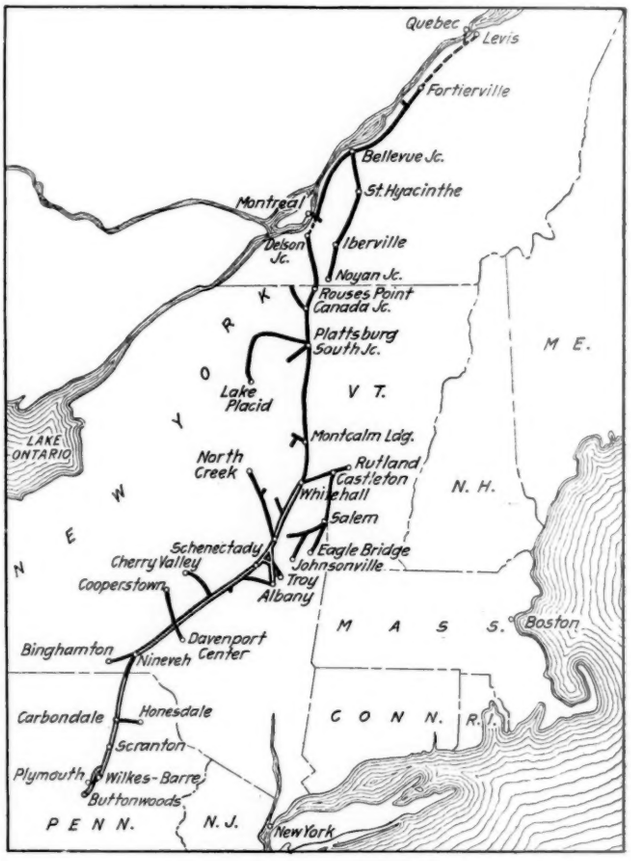
President L. F. Loree's annual reports of the Delaware & Hudson are noted for their completeness of detail and for the information they give concerning the actual operations of the road. The 1920 annual report is no exception. It is characterized by comparisons of the operations in 1920, not only with 1919 but with the annual averages for the test period from July 1, 1914, to June 30, 1917, which comparisons assist greatly in making proper analysis of the 1920 results. The figures show the usual trend in the form of increases in gross, proportionately greater increases in expenses and the corresponding decreases in net. On the other hand, they point out in marked fashion the improvements in operating efficiency towards which the Delaware & Hudson was working prior to the time the railroads were taken over.

The comparisons between 1920 and the annual average for the test period show among other things these interesting details: The railway operating revenues in 1920 were 78.04 per cent greater than the average annual operating revenues for the test period; the operating expenses, however, were 139.78 per cent greater and the operating income before the deduction of taxes 59.17 per cent *less*. The revenue ton-miles handled in 1920 were 32.08 per cent over the test period average, the revenue per ton-mile, 40.37 per cent.

The excessive increase in operating expenses resulting from advances in wages, the changes in the conditions of employment as compared with the pre-war period and the continued high costs of materials and supplies are shown in increases for 1920 over the test period averages as follows: Maintenance of way and structures, 149.27 per cent; maintenance of equipment, 159.47 per cent; transportation, 134.91 per cent. The relationship of the increases in gross and decreases in net is presumably fairly typical of what may have taken place on any railroad. It is doubtful, however, if many railroads can point to increases in operating efficiency such as are shown in an increase in the trainload in 1920, as compared with the average for the test period, of 195 tons whereby the average revenue trainload in 1920 was 842 tons; or of an increase of six tons in the revenue load per loaded car making that figure in 1920, 34 tons.

The Delaware & Hudson for many years prior to 1918 was working out a plan of development calculated to increase the efficiency of operation of the property to a measurable extent. This program was especially well co-ordinated. It included the purchase of heavier power, the building of proper terminals and shops to care for this power, improvements in the line over which the heavier trains were to run, the building of longer sidings to take care of the longer trains and the construction of various new yards necessitated by the other improvements in operation. These things naturally relate one to the other, but that seems to be a feature of railway operation which the Delaware & Hudson happens to have realized rather better than many of the other roads of the country. The improvement program is still under way, although some parts of it were held up temporarily during the latter part of federal control. The results that have been obtained are probably best shown by the increase in trainload already referred to.

The Delaware & Hudson operates 909 miles of line, of



The Delaware & Hudson

which 358 miles is double track. Its principal revenue is derived from anthracite coal; in fact, the road was built originally to carry to market the coal mined by the coal company which built it. The tonnage of anthracite handled in 1920 amounted to 12,388,943 tons of a total tonnage of 28,965,242. Hard and soft coal combined bring in about 47 per cent of the total revenues, including those from passenger traffic. The anthracite coal tonnage is secured from a compact area in the Susquehanna and Lackawanna valleys of Pennsylvania between Plymouth and Carbondale, a distance of about 38 miles. The fact that the mines are so close together is utilized as an assistance to efficient operation in a rather interesting way. Empty cars are assembled at Carbondale, are taken by road engines to the various breakers and the loaded cars are returned to the yard for classification and road movement. The prevailing movement of the coal is from Carbondale over the line to Albany and Mechanicville,

and this section of the road is the portion of greatest traffic density.

In addition to the hard coal moved, there is considerable bituminous coal and merchandise interchanged with the Pennsylvania and Jersey Central at Wilkes-Barre, with the Erie and Lackawanna at Binghamton and with the Lehigh Valley at Owego. This combined tonnage is moved to Oneonta in through trains either from Binghamton or from the Pennsylvania division via Ninevah, all of which points will be found on the map. At Oneonta the traffic is classified and moved northward to Albany, to Mechanicville, or through Saratoga for Canada. The improvements which were carried out were intended to facilitate the operation outlined. The movement southbound is principally empties, so that it does not present such complicated problems.

The changes that were made were outlined in full detail in the annual report of the property for 1918. Suffice it to say that among the most important changes was the enlargement of the yard at Carbondale completed in 1917; this enlarged the capacity of the yard to 3,139 cars, an increase in car capacity of 50 per cent. Other important changes were included in the way of larger motive power and reduction of grades. Between Ninevah and Oneonta as early as 1911 the grades were reduced to 0.3 per cent, making it possible to move full trains from Carbondale to Oneonta without breaking up the load and for one locomotive to haul from the summit north of Carbondale to the end of the division any train which can be taken to the summit by a single locomotive with a Mallet pusher. The maximum grade between Oneonta and Delanson, where the lines to Schenectady and Albany converge, is now 0.8 per cent. It is proposed to reduce this to 0.5 per cent. The work is partly completed; considerable was done on it in 1920 in the way of putting in a new third track between Schenevus and Richmondville Junction. With the maximum of 0.5 per cent it will be possible to haul trains of maximum tonnage from Oneonta to Schenectady with the use of a pusher locomotive between Schoharie Junction and Esperance only.

These various improvements were co-ordinated with a program for larger locomotives, new engine terminals, longer sidings, etc., all planned with the view to increasing freight train efficiency. It is unfortunate that more space is not available to go into the matter in greater detail, for it is these things, combined with favorable traffic conditions, which have enabled the Delaware & Hudson to continue in the van of progress as an efficient and prosperous carrier.

Mr. Loree in his report has considerable to say concerning federal control and the results of it. It is impossible to reproduce the full effect of what he says without using his own words. Speaking of the failure of the Railroad Administration to maintain the property up to its proper standard, he says:

> Notwithstanding the pledges contained in President Wilson's proclamation of December 27, 1917, and the act of Congress of March 21, 1918, and the contractural obligation deliberately assumed on December 9, 1919, your properties were not adequately maintained while they were in the possession of the United States, nor were they returned to your control in condition as good, or as fully equipped, as that in which they were taken. The extent of this undermaintenance may be illustrated by items representing renewals of rails and ties. The average number of new rails used for replacements, during the test period, was 8,223 gross tons; during federal control it was 7,607 gross tons; the yearly average of renewals of ties during the test period was 339,872; during federal control it was 270,100. Moreover, the ties used for replacement during the federal control were inferior in quality.

Again, in speaking of the policies of the Railroad Administration as to wages and rates, he makes these pertinent remarks:

> Increases in rates of wages and changes in the terms and conditions of employment made during federal control and subsequent to its termination, by the Railroad Labor Board, greatly increased the operating expenses which the railways have currently to meet. Rules which might not be seriously objectionable under special and local conditions may be wholly unworkable when given general application and it is now evident that rigid standardization of wages and working conditions has become an enormous burden upon the railway industry. Nothing is more unequal than the equal treatment of unequals. The wide area of the United States, their diverse resources, industries and economic standards and methods, have imposed varying conditions upon the performance of railway services with widely different demands upon labor and an equally wide range in the reasonable requirements of labor itself. To ignore these differences in fixing the relations between employees and railway employers must be as unsatisfactory in its results as it would be to build all railways to the same standards of grades curvature and capacity regardless of differences in the traffic requirements and in local topography. Yet such disregard of essential differences is embedded in the so-called standardization of wages and terms of employment which is an evil legacy from the period of federal control.
>
> The Railroad Administration made no effort to adjust the changes or railway service to the heavily increased expenses which it assumed by successive concessions to importunities for higher wages and reductions in the labor exchanged for wages. Unwillingness to accept responsibility for these increased expenses to the extent of putting in force rate schedules adequate to meet them resulted in the operation of the railroads at a heavy loss to the United States, and an accumulating deficit in the income account of the Railroad Administration which was forced upon the taxpayers. Whether those who pay taxes accept such burden with less protest, or with less effective protest, is a problem which the Railroad Administration or some higher authority must be assumed to have resolved to its own satisfaction.

The Delaware & Hudson in 1920 carried 27,260,813 tons of freight, an increase of 3,616,135 tons over 1919 and of 4,498,258 tons over the annual average for the test period. The average haul was 156 miles and the revenue ton-mileage 4,265,734,874. The number of tons carried one mile per mile of road, or the traffic density, was 4,692,261, which is a high average. The revenue per ton-mile was 0.918 cents and the total freight revenue $39,163,644, an increase of $9,680,199 over 1919 and of $18,047,835 over the test period average. The freight revenues constituted 86 per cent of the total revenues. As noted above, the revenue trainload was 842 tons and the average revenue load per loaded car was 33.83 tons. The miles per car per day averaged 27.9 as compared with 26.7 in 1919. The ton-miles daily per car reached the high level of 662, a figure which was exceeded by but few roads during 1920.

The operating results for 1919 and 1920 follow:

	1920	1919
Mileage operated	910	910
Total operating revenues (including passenger)	$45,354,299	$34,749,709
Maintenance of way expenses	5,114,909	4,177,864
Maintenance of equipment	12,736,975	9,980,056
Traffic expenses	386,448	237,030
Transportation expenses	21,669,668	15,606,760
Total operating expenses	42,126,330	31,886,711
Net from railway operations	3,227,969	2,862,998
Taxes	1,186,054	1,075,803
Net railway operating income	7,439,730	7,109,759

The corporate income account is as follows:

	1920	1919
Gross income	$10,431,017	$10,530,620
Total deductions	5,497,354	5,925,615
Net income	4,933,163	4,605,004

New Books

Proceedings of the Thirtieth Annual Convention of the American Railway Bridge & Building Association. Edited by the secretary. 248 pages, illustrated. 6 in. by 9 in. Bound in cloth and paper. Published by the association, C. A. Lichty, secretary, C. & N. W. Railway, Chicago.

This volume contains the proceedings of the annual convention which was held in Atlanta, Ga., October 26-28, 1920. It includes the reports of eight committees and two individual papers. The proceedings of this association are characterized by their highly practical character, discussing the problems of the field forces engaged in the maintenance of bridges, buildings and water stations.

Letters to the Editor

"Get Out and See the Shipper"

WASHBURN, MAINE.

TO THE EDITOR:

The editorials in the *Railway Age* of April 22 on "The Art of Working with Men," and "Get Out and See the Shipper" recalled to my mind a little incident which I participated in during 1915. I was asked by an officer of the express company to solicit business during a period in which hog sales were going on in the Middle West. I accepted, and the result was surprising. The sooner transportation companies get their traffic men together and make resolutions to visit and become acquainted with the shippers the quicker business will revive.

I personally believe that visiting and becoming acquainted with the shippers means additional revenue, where the use of the typewriter will promote friction between shippers and carriers, simply because the shipper is like a child that has been whipped because it does not understand. One visit from a live wire traffic man will reveal to the shipper what he most desires to know and they will be friends as never before.

Let us do away with the grievance committee and handle the things most important to the carriers of our country in a business-like manner and all will be well. I am a "Get Out and See the Shipper" advocate.

H. SHANER.

The Simple Gospel of Self-Control

ST. LOUIS, MO.

TO THE EDITOR:

The operation of the law of pivotal points or diminishing returns so often amplified by the late Elbert Hubbard was well illustrated in the abuse of the privileges of the Railroad Labor Board by B. M. Jewell in his address before that board, as spokesman for railroad labor on April 28, when he took up the time of the board in making allegations manifestly and obviously untrue, i. e., that railroad laborers' losses were so great during the war period that it will take them three years to even up; that living costs had not been reduced sufficiently to warrant wage reductions, and so on, "ad infinitum, ad nauseum, ad disgustum." The effect of such manifestly misleading statements published broadcast can only have one effect; and that is to militate against the very men who are supposed to be represented.

As was pointed out in an article in your columns signed "Agriculturist" on November 3, 1916, combinations of railroad and other labor, as a result of advantages of urban life, invariably have the best of it in the cycles of increased wages and costs, over the producers and in particular the farmers, in that these labor combinations enjoy the advantage of prices based on lower labor costs for several months after the wage increase, while the effect of the increase is finding its way into costs of the various necessities. About the time the cycle is completed another raise in wages is forced, with the same result. This is recent history. Labor finally pushed a good thing so far as to pass the pivotal point, and it finally ran up against the wall of enlightened, angered public opinion.

From conversation with many men in the ranks of railroad labor I feel that I know that this man's statements, as quoted above, do not truly represent the views or even the wishes of a large per cent of the thinking, reasoning men whom he presumes to represent.

As is well known, the thrifty, frugal railroad men have saved more money and enjoyed more of the luxuries of life during the war period than they ever did before; and the present crisis is due in large measure to the orgy of spending by a large per cent of railroad men as a result of money coming so free and easy. Many of these men now awaken to find an overdrawn bank account and no job.

Because of the devastation of the war, railroad and other workmen in this country were permitted almost to name their own terms; they profited at the expense of the unfortunates on the other continent. The war is now behind us, and the people of Europe are again at work producing and in competition with us; and we can no more avoid the result of this competition by fiat or resolution, as Jewell proposes, than we can escape by wings to the moon. Railroad labor took the lead in wage advances, and if it does not take the lead down, it will at least have to come along with labor in other lines. There is no peculiar or special fitness required in railroad labor which justifies calling it an excepted class; and the level-headed men in the ranks do not expect it.

Such extravagant statements as these attributed to Jewell come near to being treasonable; certainly unpatriotic; and it is only a little less criminal for the press to give them publicity. They incite the ignorant and unmoral element finally to class hatred and to crime, and they retard the readjustment now so necessary for the good of all. If Jewell will get away from Chicago long enough to get his ear to the ground and listen to the more intelligent of the men he presumes to represent he will hear the whisper, "We prefer work for all, at wages that will start the mills and factories; then, as a result of increased production, prices of life's necessities will come nearer to our reach; and never before."

If there were one thing more striking than another in all of our experiences incident to the great war it was that as wages were artificially held up and horizontally applied, efficiency decreased correspondingly.

We have an illustrative example in Russia today, where Lenine and Trotzky are "saving" the laboring class by the same fiat, i. e., less work and higher pay, with the sad results known to all the world.

There is a point of refinement and luxury (accompanied by lack of enthusiasm and interest and joy in labor) beyond which a nation cannot go and survive. Jewell and some of the other spokesmen for labor are cultivating the spirit of unrest and prejudice which make for that condition.

Spokesmen for labor have gone wild in their chase after luxury by legerdemain. Where today will you find one who dwells on the nobility of labor and the necessity (for the worker's best interest) to put enthusiasm into his work for the real joy in it? Or one who reminds his constituents that the real abiding joys of life come to the producer, not the spender; that man must finally "*earn* his bread by the sweat of his brow"?

Surely these are times which call loudly for consideration of the following words of the great Irish statesman, Burke; as loudly as did the times when they were uttered, nearly 150 years ago:

"Men are qualified for civil liberty in exact proportion to their disposition to put chains upon their own appetites—in proportion as their love of justice is above their rapacity; in proportion as they are most disposed to listen to the counsels of the wise and good, in preference to the flattery of knaves. Society cannot exist unless a controlling power over will and appetite be placed somewhere; and the less of it there is within, the more there must be without. It is ordained in the eternal constitution of things that men of intemperate minds cannot be free. Their *passions forge their fetters.*"

When we indulge in sentimental and false self pity, we are tending toward bolshevism.

A RAILROAD WORKER.

Providing Incentive by Time-Rate Payment

Flexibility Demanded in Successful Effort-Wage System Secured Only by Using Logical Basis

By G. W. Armstrong

THE RETURN OF PIECE WORK on the railroads is receiving serious consideration in many quarters. Conditions are changing so rapidly that it is important, if piece work is to be restored, that it be on such a basis as to provide flexibility of rates in accord with the changing costs of living. For instance, a piece work price established today might be entirely out of line with one established next September, and some provision should be made to overcome this difficulty. Lack of flexibility to meet sweeping new conditions largely contributed to the abolishing of piece work on the railways under federal control. Lack of flexibility to meet similar changing conditions in the future will supply difficulties, possibly disastrous in their consequences to the principle of incentive wage payment.

A. B. C. RAILROAD
WORKMEN'S PIECEWORK ORDER

Department Car Date 1/25 1921

Charge	Schedule Number	Number Pieces	Cost Per Piece	Total Cost	Description of Work
Ast	E 3602	200	.025	5 00	Rivets cut out of Hopper floor
a Rpr					and side sheets
	E 3610	200	.025	5 00	Rivets driven in Hopper floor
					and side sheets
				10 00	

Foreman John Smith Checked by William Jones

DISTRIBUTION

Names of Workmen	Date and Hours Labor Performed — Date	25	Total Hours	Hourly Rate	Earnings Pro-rated
Geo Black 625		4	4	85	5 00
Harry White 626		4	4	85	5 00
	Hours			Total	10 00

Fig. 1—Typical Piece-Work Order and Distribution Cards

Payment on the basis of individual effort is a powerful aid in securing maximum output. To insure maximum incentive, commensurate output and equitable administration, the wage payment system should be simple in application and basically sound.

Flexibility an Essential

An acceptable wage payment system based on productive effort must be flexible enough to care for varying conditions. Hourly rates of wage payment must vary as the cost of living varies; and a system of payment based on productive effort must conform in some degree to the fluctuations in hourly rates.

Productive-effort wage-payment systems must be founded on a standard which is set up as a unit of reference. The essential, therefore, for any acceptable standard is that it shall involve a minimum of variable factors. Variable factors affecting wage payments are the hourly rate of the worker, the condition of materials, the nature of machines as to feeds and speeds and the skill of the worker.

Conditions of materials and nature of machines as to feeds and speeds are capable of reasonably accurate determination and therefore form the basis for a standard performance, expressed in terms of time. Hourly rate provides the adjustment for cost of living and skill of the worker affords the incentive to repay effort.

Time the Logical Basis

Time is the most stable measure of effort, consequently, the logical basis for a standard. That there are more systems developed on time as a basis is no more an accident than that gold has been selected as a basic monetary standard. The same principles that make gold a basic standard, namely, freedom from excessive fluctuations in quantity and value, and definiteness of measure, are those that make time the only satisfactory standard of measuring performance.

The following systems have been developed upon a time basis and each has merits which recommend it for specific application.

The Halsey system employs a standard time and compensates the worker for the reduction in time effected, equally or on a fixed proportion between the company and the employee.

The Emerson system employs a standard time, generally more accurately determined than the Halsey system and bonus begins when production equals 67 per cent of the standard set. As the production approaches standard, the amount of bonus applicable to earnings increases and after the attainment of standard, the additional bonus is the increment over 100 per cent which the time consumed is of the standard time.

The Gantt and Taylor systems employ a very accurately determined high standard time; are applicable to exceptional men only and bonus does not begin until standard time is equaled when it sharply adds a substantial increase to earnings.

Piece-Work Lacks the Proper Basis, Time

Piece-work or the piece-rate system is the only exception in effort payment to a basic-time system. It is a system based on cost, a product of time and employee's rate, in which time is the only stable factor.

The piece-rate system is the oldest wage incentive system. It owes its wide use and application to its prior development and also to its simplicity and understandability by the wage-earner.

Simplicity and understandability are desirable requisites of an effort wage system whether used on a railroad or in an industrial plant. However, simplicity and understandability at the expense of flexibility are not desired when they can be secured through the use of a system which is basically sound.

Shop morale is sure to suffer unless the worker has the insurance of adequate added remuneration for faithful effort. Faced by mounting wage rates in 1918 the adjustments required to bring piece rates into harmony presented a collossal, almost insurmountable obstacle to the railroad managements. What was needed was automatic adjustment.

Piece rates set up on the present wage structure will ultimately develop an even more drastic problem of reconstruction in the future. Readjustment over a term of years will

undoubtedly bring a lower wage level. Raising piece rates always is difficult, cutting virtually impossible. How will a universal cutting be accomplished when readjustment is needed? This adjustment can be accomplished automatically in harmony with wage rates by the selection of a time-rate instead of a piece-rate system.

Simplicity and Flexibility

Keynotes of Time-Rate System

A time-rate system would involve solely the supplanting of a piece-price by a time allowance. It embodies simplicity, it is readily understandable by the worker and it automatically compensates for fluctuations in hourly rate. Furthermore, it furnishes the necessary data for comparing performance on the basis of man-hours, giving a standard which is independent of the wage rates. Another important characteristic of the time-rate system is that it insures to the worker the same proportionate increase in his hourly earnings for the same effort irrespective of any changes in the basic hourly rate.

Time, as previously explained, is the proper basis for a standard. Time can be determined for the performance of any given work, time records can be preserved to justify time standards established and the relation of actual time required to the time allowed measures the quality of performance.

Guarantee of minimum earnings at an established fair hourly rate should in justice be accorded the workman. Improper setting of the time allowance, faulty condition of the material, selection of unsuitable facilities, or other conditions beyond the control of the worker equally as well as lack of skill on the worker's part may be the cause of less earnings than the minimum guarantee.

Earnings at the flat hourly rate of an individual effort-paid worker, therefore, denote a need for investigation. They serve as an indicator or signal to arrest the attention of the local supervisor of the incentive system. Investigation will then develop whatever adjustment is required by the management or whether replacement or transfer of the employee is required due to his unfitness or lack of skill.

Time Rate System in Application

As explained, time replaces cost in the time-rate system. Thus instead of a piece-rate allowance of 25 cents for turning and fitting a knuckle pin to rod jaw only, a time-rate allowance of 30 minutes or 0.5 hours would be made. Assuming that the actual time required to perform this work was 20 minutes, so that three pieces are produced per hour, the earnings under time rate and piece rate systems with increasing hourly rates would be:

Hourly Rate	Earnings Per Hour — Time Rate	Piece Rate
$0.25	3 x 0.5 x 0.25 or $0.375	3 x 0.25 or $0.75
0.30	3 x 0.5 x 0.30 or 0.45	3 x 0.25 or 0.75
0.55	3 x 0.5 x 0.55 or 0.825	3 x 0.25 or 0.75
0.68	3 x 0.5 x 0.68 or 1.02	3 x 0.25 or 0.75
0.85	3 x 0.5 x 0.85 or 1.275	3 x 0.25 or 0.75

This, of course, presupposes that the piece-rate was not altered as the hourly-rate increased. Who knows how to increase the vast number of railroad piece rates and maintain a proper adjustment? Every time an adjustment is made someone must take action, while with the time-rate system the adjustment is automatic.

In simplicity and ready understandability by the worker, the time-rate system is similar to the piece-rate system. Earnings at the time rate are the product of the number of pieces multiplied by the time allowance (expressed as a decimal) multiplied by the hourly rate. Only one additional calculation is required, but compensation is provided for wage rate adjustment such as the piece-rate system cannot afford. Piece-rate earnings are the product of a fixed cost, i. e., piece price multiplied by the number of pieces.

Comparison of Time-Rate and Piece-Rate Application

The application of a time-rate and piece-rate system to a day's work is shown by Figs. 1 and 2 respectively, illustrating this similarity in ready application and simplicity of calculating earnings by the workman. Examples of the supporting work schedules for the time-rate and piece-rate system are shown in Figs. 3 and 4.

From these examples it will be observed that the application is virtually the same as that employed under the piece-rate system. The only difference is figuring in time instead of money until the final computation, then converting into payroll equivalent. The only other main point of variance would be the necessity to set the time allowance upon a per-man basis and to avoid excessive manning of a job, by stating in the schedule the number of men required.

A. B. C. RAILROAD
WORKMEN'S TIME WORK ORDER

Department Car — Date 1/25 192L

Charge	Schedule Number	Number Pieces	Time Allowed	Total Time	Description of Work
Dis.	E3604	200	0.03	6.0	Rivets cut out of hopper floor and side sheets
Ch. Bgs	"				
	E3608	200	0.03	6.0	Rivets driven in hopper floor and side sheets
				12.0	

Foreman John Smith — Checked by Wm. Jones

DISTRIBUTION

Names of Workman	Date and Hours Labor Performed — Date 25	Total Hours	Total Time Allowed	Performance	Hourly Rate	Earnings
Geo. Black 625	4	4	6.0	150%	85	5 10
Henry White 626	4	4	6.0	150%	85	5 10
	Hours					
					Total	10 20

Fig. 2—Typical Time Work Order and Distribution Cards

TIME RATE SCHEDULE
STEEL CAR WORK

Schedule Number	Schedule	Time Allowed Hours
	Rivets cut out, includes cutting off, drifting or backing out and removing material, as follows:	
E—3604	Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 5/8" or 3/4" diam. each rivet, allowance per man	0.03
	Rivets driven with pneumatic hammer; includes heating and all work as follows:	
E—3608	Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 5/8" or 3/4" diam. each rivet, allowance per man	0.03

Fig. 3—A Typical Time-Rate Schedule

Time-Rate Insures Fair Application

Under the time-rate system, the ratio of time allowed to time consumed is a fair indicator of the quality of performance. Too often in the past this was not true with the piece-rate earnings as compared with day-rate earnings. The piece-work system has been utilized as a subterfuge to raise

wages when due to the necessity for false strict economy, it was difficult to secure authority for adequate hourly rates. Consequently, piece rates were based on earnings considered fair and desirable when working under piece-work conditions. For the reason stated above this "piece-work rate" was too often disproportionate to the hourly rate and resulted in an unusually large actual piece-work earning per hour. This condition introduces an additional serious complication to that already presented in the fixed-cost wage system in adjusting piece rates to the fluctuations of hourly rates following the trend of the labor market.

Another effect of the inflexibility of a piece-rate or cost system is the result where men of varying skill and conse-

PIECE-WORK SCHEDULE

STEEL CAR WORK

Number Schedule.	Schedule	Piece Price
	Rivets cut out; includes cutting off, drifting or backing out and removing material as follows:	
E—3602	Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 5/8" or 3/4" diam. each...	.025
	Rivets driven with pneumatic hammer; includes heating and all work as follows:	
E—3610	Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 5/8" or 3/4" diam. each.....	.025

Fig. 4—A Typical Piece-Rate Schedule

quently different hourly rates are employed on similar classes of work. In the event that the piece-work price is established upon a high rate man and later satisfactorily performed by a lower class workman, a decided overpayment as related to other workmen will result. Further in the operating of a piece-work price requiring the use of one or more mechanics, with one or more helpers, it will be realized that the respective earnings will be dependent upon the rates of pay and hours worked by each workman rather than upon their respective skill. In the event that a higher rate must be paid to retain helpers without a proportionate increase also being allowed mechanics, a pro-rating of piece-work earnings will increase the helpers' earnings and decrease the mechanics' without any modification in the proportionate share of work performed.

The dissatisfaction, or at least confusion, which thus frequently results under a piece rate or fixed labor cost system, from working men of varying skill and experience upon the same operation at the same piece rate, or several workmen of varying skill and experience upon the same operation and pro-rated together, can be satisfactorily overcome by a separation of the time and rate elements and the discontinuance of their combination in a piece-rate system.

Conclusions

This would be accomplished by the introduction of one of the available wage payment systems based on a time standard instead of a cost standard; the time-rate system described, however, being best suited for railroad operating conditions. Hourly rates must be allowed workmen consistent with their ability and the state of the labor market. A basic time system automatically accommodates itself to these variable demands and at the same time a system can be selected which will fully compensate the workman for effort expended in increasing production. And in the last analysis the merits to the management of the system selected are a balance between the incentive and the reduction in cost (both labor and overhead).

THE UNION OF SOUTH AFRICA will shortly seek a large loan in this country to purchase construction materials.

Seasonal Coal Rate Bill Reported Favorably

WASHINGTON, D. C.

THE FRELINGHUYSEN seasonal coal rate bill, amended to authorize the Interstate Commerce Commission in its discretion to prescribe seasonal differentials instead of having them fixed by law, was reported favorably by the Senate Committee on Interstate Commerce on May 16 after having been reintroduced in the new form by Senator Frelinghuysen. The bill is to amend section 15 of the interstate commerce act by adding a new paragraph as follows:

(19) In order to promote continuous operation of coal mines, steady employment of coal miners, and economical use of facilities for distribution of coal, the commission is hereby authorized to initiate, establish, approve, or adjust rates for the transportation of coal during specified seasons or periods which shall be greater or less than the rates for other specified seasons or periods but which in the judgment of the commission will yield as nearly as may be the same annual revenue for like movement as rates without seasonal variation, to be maintained by carriers as a whole or as a whole in each of such coal rate groups or territories as the commission may from time to time designate for that purpose, or by such carrier or carriers as the commission may designate. The term "coal" shall include anthracite and bituminous coal, lignite, coke, including petroleum coke, and briquettes and boulets made from anthracite and bituminous coal and from coke. Whenever the commission is of opinion that an emergency affecting the transportation of coal and requiring immediate action exists in any section of the country the commission shall have, and is hereby given, authority, either upon complaint or upon its own initiative without complaint, at once if it so orders without answer or other formal pleading by the interested carrier or carriers, to suspend the operation of any schedule in so far as it affects coal rates, whether seasonal or not, upon filing with such schedule and delivering to the carrier or carriers affected thereby a statement in writing of its reasons for such suspension, and defer the use of such coal rates, and to initiate in lieu thereof such seasonal rates for the transportation of coal as in its judgment the emergency may require. The commission shall thereupon enter upon a hearing concerning the lawfulness of the schedule, the operation of which had been so suspended, and the proceedings thereon shall be the same as nearly as may be as those provided in paragraph (7) of section 15. Nothing contained in this paragraph shall be construed as repealing, modifying or denying any other authority heretofore conferred upon the commission.

Senator Frelinghuysen's Report

In his report on the bill Senator Frelinghuysen said in part:

The bill incorporates suggestions made by Chairman Edgar E. Clark, of the Interstate Commerce Commission, and it has the unqualified and unanimous approval of the members of that commission.

The committee believes that legislation of this character, authorizing the Interstate Commerce Commission to initiate lower freight rates on coal during the spring and summer months and higher rates during the fall and winter months, will tend to encourage consumers to develop storage accommodations, to accept deliveries of coal in advance of their seasonal needs, and thus to keep the mines operating more constantly throughout the year. The committee is of the opinion that such legislation will bring about the following beneficial results:

1. It will stabilize the price of coal. The capacity output of all the coal mines in the United States, assuming fairly constant operation, would far exceed the present consumption. The output of all these mines working as at present only intermittently during the spring and summer months and working to capacity during the fall and winter months is barely sufficient to supply the current needs and the greatly increased cold-weather demand for coal. During the winter the demand so nearly equals the currently available supply that scarcity prices prevail. In addition to this the actual cost of production per ton is unduly enhanced because the operator must during the time his mine is closed down or working intermittently keep together his organization and expend money for the upkeep and maintenance of the property, all of which must be added to the price of the coal which he

mines and sells during the rush season. If the demand for coal were reasonably constant throughout the year, many of these costs based on holding plant, capital, and personnel idle for a large portion of the time would disappear, and the price of coal would more nearly represent only current costs of production plus a reasonable profit, leaving no opportunity for charging scarcity prices during the months when the greatest amount of coal is consumed.

2. Such legislation will obviate very largely the pressing necessity for more coal cars. The present supply of coal cars, while totally insufficient to handle the fall and winter rush under existing conditions, would be fairly adequate to carry all the coal desired by consumers if this equipment could be kept moving with greater regularity throughout the year, as would be the case if the advantage of lower summer and spring freight rates could be held out to induce consumers to receive coal shipments in advance of their winter needs.

Would Remedy Inadequacy of Terminal Facilities

3. Such legislation would remedy the present inadequacy of terminal facilities. The large amount of coal which must now be transported within a comparatively short time in each year tends to glut already overcrowded terminals. The increasing inability of existing terminal facilities to handle extraordinary seasonal demands without entailing serious delays and disproportionate terminal costs is one of the most glaring weaknesses in the present American railroad transportation system, according to the testimony of Chairman Clark.

4. Such a measure would promote regularity of employment in the mines, and would thus settle most of the outstanding grievances of the miners.

The committee finds, from an examination of some of the disadvantages which might appear to inhere in the requirements of lower spring and summer freight rates for coal shipments, that most of these objections are untenable.

1. The revenues of the carriers would not be affected. A large amount of coal would still have to be mined and shipped in fall and winter to consumers who lacked the capital, credit, foresight, or storage accommodations to enable them to secure their supply during the warmer months.

2. The transportation of more coal in the spring and summer will not embarrass the railroads in handling other seasonal movements, e. g., crops. In some localities cars carrying grain are loaded only in one direction, returning empty to the point of origin because of lack of shipments moving in that direction. If coal could be encouraged to move at the same time, this wasteful practice of hauling empty cars might be at least partially eliminated. Operating conditions during the clear weather of the spring and summer months are much more favorable, so that railroads can better withstand heavy demands for transportation at that period of the year than during the fall and winter months when coal has heretofore moved in greatest volume. The cost to the railroads of transporting coal is also much less in warm weather, when locomotives can haul heavier trains, when they consume less fuel, and when fewer employees can handle more traffic.

3. The acquisition of more coal cars does not afford a practicable and complete remedy for existing difficulties. Under the Transportation Act, the Interstate Commerce Commission is given the power to require carriers to provide themselves with sufficient cars. But most of the railroads have neither the money nor the credit with which to buy a supply of coal cars adequate for current needs under the present system of large seasonal shipments, so it would be useless for the commission to order them to purchase this equipment. On the other hand, most of the railroads which have enough money or credit to finance such purchases already possess an adequate number of coal cars to care for the needs of their own patrons, and they could not reasonably be required by the commission to purchase additional cars to take care of the traffic of other lines.

4. It may be urged that the interstate commerce act now contains ample provisions to permit the commission or the carrier to institute lower summer freight rates for coal. The conclusive answer to this contention is that, during the many years that the same provisions have been law, this practice has never been introduced. The commission does not believe that it possesses the power to require the establishment of such seasonal rates on coal. It has never attempted to exercise this power, and its chairman states that it does not contemplate doing so in the future in the absence of furher legislation. The commission assumes that, in prescribing rates and practices, it is not empowered to initiate new systems of rate making, designed principally to remedy general economic situations. It feels that this should be the subject of specific legislative authorization.

While a considerable number of coal operators appeared at the hearings and testified against the proposed legislation, the opposition of the operators was by no means unanimous. One of the most earnest advocates of this legislation is Eugene McAuliffe, of St. Louis, Mo., a gentleman who is interested in various coal mines and public utilities, and who has had many years of experience in connection with the operation of railroads. Most of the operators who opposed the legislation founded their objections on local considerations peculiar to their own properties in relation to the changes in rates proposed in this legislation. For example, certain operators whose coal is of such inferior quality that it will not store satisfactorily, feared the introduction of rates which will encourage the storage of the coal produced by their competitors. The sub-committee feels, however, that legislation which will result in incalculable benefit for the whole public, and which will entail but slight disadvantages for the great majority of mine operators, should not be denied approval because it may be injurious to the interests of isolated coal operators.

The committee realizes, of course, that the feasibility and effectiveness of the proposed legislation depends very largely upon the practicability of storing coal in large and small quantities. It therefore solicited and received a large amount of testimony from such experts as George Otis Smith, Director of the Geological Survey, various coal operators, and from coal dealers on this point. As a result of this testimony and from information secured through correspondence, the committee entertains no doubt whatever but what practically every kind of coal mined in the United States can be stored safely, conveniently, and cheaply. The tonnage of coal produced which cannot be stored satisfactorily is almost negligible.

Coal Industry Stabilization Bill

The committee also favorably reported Senator Frelinghuysen's "coal industry stabilization" bill. The object of this bill is to direct the Department of Commerce and the Bureau of Mines to make a careful study of all conditions pertaining to the coal industry, in order that the government may assist in stabilizing the coal industry and in working out the problems which now exist in the mining, distribution, and sale of coal.

The bill directs the Secretary of Commerce to investigate the production of coal, the stocks of coal on hand, the distribution of coal in commerce, and coal prices. In case of an emergency and whenever necessary in the judgment of the President, upon proclamation of the President, the Secretary of Commerce is directed to investigate costs and profits in connection with the mining, sale and distribution of coal.

Section 7 authorizes the Secretary of Commerce, upon request and to the extent he deems proper in the public interest, to place any information in his possession in the hands of public boards and commissions engaged in the arbitration, conciliation, or settlement of labor disputes in coal mines. The section provides that no information shall be given such boards which will disclose the business of any person.

Section 8 authorizes the Secretary of Commerce to investigate the practicability of a statutory zoning system defining the distance from the mine in which coal may be transported in commerce and requires a report by December 5, 1921.

Section 9 directs the Secretary of Commerce to investigate the practicability of the purchase of coal for the use of the government by one central agency and requires a report relative to the same by December 5, 1921.

Section 10 authorizes the director of the Bureau of Mines, under the direction of the Secretary of the Interior, to investigate the methods and processes for the storage, inspection, sampling, analysis, purchase, classification, and economical utilization of coal, with a view to determine the most efficient means for coal storage, and to obtain information relative to the processes involved in the preparation, transportation, and utilization of coal.

Section 14 requires the Interstate Commerce Commission to co-operate with the Secretary of Commerce in securing a proper distribution and use of coal cars, in order to promote the most efficient transportation of coal in commerce.

Economic Advantages of Large Freight Locomotives*

A Thorough Study of the Effect on Various Items of Expense Is Necessary to Determine the Most Suitable Type

By A. F. Stuebing
Mechanical Department Editor, *Railway Age*

PROBABLY THE BRIEFEST presentation of the advantages of large locomotives is that made by James J. Hill: "Receipts are by the ton and passenger mile; expenses are by the train mile." It is not to be expected that such a general statement will hold good in all particulars, nevertheless it is true that a large proportion of operating expenses decrease as the train load increases, although not in the same proportion as the decrease in train miles. Under the operating conditions existing on most of the main line mileage of this country, the greatest possibilities for economy are probably still to be found in the adoption of locomotives of high capacity.

The large locomotive, designed merely for high rated tractive effort, is not a panacea for operating troubles. The first requisite is a design suited to the conditions of the operating territory, the traffic and the service. The relative advantage of specific designs is a problem in the economics of operation that must be solved by the application of engineering principles. It is a question of adapting the design to the operating and economic conditions and then co-ordinating the motive power with other facilities. The last requirement is of great importance for unless all the varied operations can be kept in step, the machine as a whole cannot run smoothly.

The adoption of improved motive power should be only one part of a co-ordinated program. Every appropriation for larger engines should carry with it, as an integral part, provision for facilities to insure the maximum utilization of the power. Engine terminals, shops, yards, the rolling stock and the track structure itself should be prepared to assist in obtaining the proper operating results. The co-ordination of facilities deserves careful study.

The Selection of Motive Power Has Far-Reaching Effects

The choice of motive power is of extreme importance because the characteristics of the power affect the earnings more than any other single factor and determine the efficiency of operation usually throughout the life of the engine. The problem of introducing new locomotives is similar to the problem of reducing grades and should be studied as thoroughly. The interrelation between the various factors affected affords large opportunities for savings and also for losses. No executive should be satisfied with a superficial analysis of the probable effect of a new type of power on operating costs. This is one of the problems of operation that has often been studied in a general way, but has seldom been analyzed quantitatively. The writer has made an attempt to develop a general method of determining the savings that might be expected from the use of high capacity locomotives, but at every step was so hampered by lack of accurate information that the conclusion was finally reached that there is no method of solving the problem without extensive research. Many investigations have been held up during the past few years, and the rapid changes in prices have made earlier data inapplicable. It would seem, therefore, that there is a large field for research in the economic problem of operation when normal conditions are restored.

*A paper to be presented at the Railroad session of the Spring meeting of the American Society of Mechanical Engineers, Congress Hotel, Chicago, May 26.

A Shortcoming of Operating Statistics

The operating statistics as compiled at present are valuable for the analysis of existing conditions, but they furnish little information as to what would happen under other conditions. Thus the predetermination of operating results, which is most important from the standpoint of improved operation, is largely dependent upon the researches of the individual roads and of engineering organizations. Vast numbers of unrelated figures are compiled, but they are of little benefit in the solution of the general problem. What is needed is not merely a statement of the expenses under fixed conditions, but the rate of change of expenses under certain varying conditions, such as train load and speed. If such data were available, the analysis of operating results could be made more truly a diagnosis, rather than a mere post mortem. The investigation referred to above brought out numerous aspects of the economics of operation that apparently merit attention and a few comments on these points may be pertinent.

Many Factors Affect the Economic Value of the Locomotive

Most of the available reports on the economic value of large locomotives consider comparatively few of the items affected. The comparative costs of wages of train crews, of fuel and water and of repairs to locomotives are often the only items considered. In some few cases the comparative mileage and fixed charges on the investment in motive power have been computed. This is not sufficient to determine conclusively the relative merits of various types of power. The locomotive has a direct or indirect influence on many items of expense in the maintenance of way, maintenance of equipment and transportation accounts. The real problem in determining the value of a locomotive is to find the effect that its operation will have on the sum total of these accounts. The complexity of the problem has apparently often deterred railroads from giving it detailed consideration. However, it is a matter that goes to the very heart of the problem of economical operation and the results of a thorough study should more than justify the labor involved.

It is the purpose of the following paragraphs to point out some aspects of the problem that apparently are deserving of attention. A search through the literature on this subject has failed to disclose fundamental data on these questions that is applicable to present conditions.

The Effect of Motive Power on Maintenance of Way Expenses

Some roads have reached adverse decisions on the adoption of 2-10-2 type locomotives on the ground that the increased cost of roadway maintenance resulting from their use would more than offset the savings in wages. This opinion does not seem to be generally held, but as one of the arguments against heavy locomotives, it deserves recognition. Maintenance of way expenses make up about 17 per cent of the total operating expenses, but the greater part of the expenditures are independent of the character of the power. Much of the work of track maintenance is made necessary by the action of the elements, or by the necessity of maintaining the permanent way in suitable condition for fast passenger traffic. The

expenditures which are most directly affected by heavy locomotives with long, rigid wheel base are rail, ties and track laying and surfacing.

There is little or no information available as to the comparative effect of four and five pairs of coupled wheels on rail wear and the other accounts affected. The more rapid wear of tires indicates that the effect on the rail is appreciable and the tendency to straighten out the track, no doubt, increases the cost of maintaining it in line. The actual effect will vary according to the wheel base, the curvature of the road and whether the locomotive has one or more pairs of drivers equipped with lateral motion devices.

The sum of the maintenance of way expenses which may be increased by heavy motive power is about 10 per cent of the total operating expenses and if the effect is to increase these items considerably, the saving will be difficult to make up in other accounts. However, if the wear and tear on the track is merely proportional to the weight of the engine, as is sometimes assumed, light and heavy engines would be on a par as regards these items. The difference of opinion on this question suggests the necessity for a careful investigation.

Maintenance of Equipment

In any study of locomotive operation the cost of equipment maintenance deserves careful attention. The percentage of the total operating expenses falling in this classification has shown a fairly consistent increase over a considerable period. Locomotive repairs and renewals, which in 1898 amounted to 5.9 per cent, in 1918 had increased to 11.7 per cent. So many factors may influence this ratio that no definite conclusions can be drawn, but it is significant nevertheless.

The principal difficulties in maintaining large locomotives are due to the short life of driving wheel tires, driving boxes and main pin bearings. With the proper facilities and proper construction the work of caring for these parts becomes merely a matter of routine running repairs, but where the lack or inadequacy of terminal facilities hampers repairs, the loss of service due to these minor items may become serious. In extreme cases the mileage per month may be reduced so much as to make the fixed charges per ton mile unreasonably high. It is hardly necessary to point out that this should not be charged against the locomotive itself.

While the foregoing remarks are confined to some of the more important items of roundhouse maintenance, they are equally applicable to the work of classified repairs. If the shops and shop machinery are not adequate for new power, repair charges will be high and the time out of service will be increased. The cost of these facilities should be considered when estimating the saving that may be effected by new power. The shop should be regarded as an accessory that is essential to the efficient utilization of the large investment in motive power. Too often the question is decided on the basis of the direct saving on repair operations, without considering the value of the locomotive days saved by proper facilities.

Wide differences of opinion appear to exist regarding the relative cost of maintenance and mileage of 2-10-2 type and Mallet locomotives. While the field for each is to a certain extent distinct, there are districts where either might be suitable and roads that have sufficient data to permit a fair comparison could perform a service by furnishing information that would clear up this question.

Long Trains May Increase Car Repair Costs Considerably

A very serious problem in connection with the use of locomotives of high capacity is the effect on the cost of repairs to freight cars. The total amount spent for repairs and renewals is nearly as great as the repairs and renewals to freight, passenger and switching locomotives combined. When the length of trains is increased beyond a certain point, break-in-twos, shifted loads and damage to the cars in general may increase at a rapid rate. It is not inconceivable that the expense resulting from hidden damage may nullify savings in other items. Local conditions determine whether or not this is an important factor. The effect of increasing the length of the train would be but slight where short heavy trains of steel cars are hauled. It may be serious where the road cannot control the character of equipment in the trains, where the car load is light, the train long and the lading is subject to damage, or of such a nature that it may shift and damage the car. It is significant to note that the study of the operation of Consolidation and Mikado locomotives made by N. D. Ballantine showed the time delayed due to car failures was more than twice as great with the Mikado engine, which had a tractive effort of 57,000 lb., than with the Consolidation of 39,000 lb. tractive effort. No record is available of the cost of repairing the cars involved in these failures nor the defects noted at terminals that were chargeable to unavoidable shocks incidental to the operation of the longer train.

A study of car failures in long trains may demonstrate that the trouble is largely due to equipment with weak underframes. The greater portion of the damage is done to the draft gear and sills, and it is doubtful whether sills meeting the recommendations of the American Railway Association would fail except under the most extreme stresses set up by surging in trains. If wooden underframes are a serious hindrance to the operation of long trains, the remedy can be applied with little difficulty. While the reinforcement of the remaining cars of this type still in service would require fairly heavy expenditures, it would no doubt be justified by the saving in repair costs and improved operation.

Transportation Expenses

The character of the motive power has a decided influence on the expenses falling under this head. Directly or indirectly, the locomotive affects items in the transportation expenses which amount to about 35 per cent of the total operating expenses. However, some of the accounts seem to be affected only slightly and the importance of locomotives, which are merely capable of delivering high tractive effort at low speed in reducing transportation expenses, has, no doubt, often been overestimated.

Two of the important items which are reduced almost proportionately as the tractive effort increases are wages of train enginemen and trainmen. The economies in these expenses are considerable and they can be predetermined with a fair degree of accuracy. Probably for this reason they have assumed undue prominence. In the year 1918 the wages of train employees amounted to 10.5 per cent of all operating expenses. The fuel bill for road engines was practically as much. The cost of locomotive repairs was even greater and freight car repairs only slightly less.

Relative Importance of Fuel and Wages of Train Crew

Some of the costly measures necessary to obtain slight increases in the train load can probably never be justified on the basis of the savings in the wages of train crews and some of the related savings are problematical. Railroad officers when considering means of promoting economy might well keep in mind this thought: The gross saving due to a given percentage reduction of the mileage of train enginemen and trainmen under average conditions is equalled by the saving due to a like reduction in the consumption of fuel.

Passing to the consideration of the relative fuel consumption of heavy locomotives, each increase in size results in slightly better fuel performance, provided that similar care is used in the design. The essential features of an efficient boiler are large grate area, ample firebox volume and tubes of suitable length to prevent excessive losses in the waste gases. All these can be obtained in the 2-10-2 type or other

heavy locomotives. The large cylinders used with such power are also advantageous because the smaller ratio of the area to the volume reduces the heat loss in the cylinders. Within the range of normal operation, however, the difference in the fuel consumption per unit of work with a well-designed locomotive of the 2-10-2 type and the Mikado type, for example, is probably negligible. The remarkable fuel performance credited to some designs of Mallet compound locomotives suggests the advisability of establishing in as conclusive a manner as possible the comparative results of this type of compound and typical large simple engines.

Some Items of Expense That Have Been Given Little Attention

The expenses directly chargeable to train service aside from fuel and wages, include lubricants and locomotive and train supplies. These items are of less importance than those previously mentioned and, in general, the charges per ton mile decrease as the tractive power increases.

The expense of yard operation is seldom considered as being influenced by the character of the road engines. In hump yards the cost of switching is probably independent of the length of the train. However, in drilling yards the necessity of hauling long cuts of cars reduces the speed of switching and increases the fuel used. While the net result is largely dependent on local conditions, this factor is of some importance and should not be passed over lightly in analyzing problems of operation with heavy power.

Enginehouse expenses likewise are affected by the character of the power to an extent depending on local conditions. The reduction in the number of units handled will cause a slight decrease in the cost per ton mile unless the new equipment requires additional facilities.

While the major items of operating expenses which enter into the problem of large locomotives have been discussed above, it is pertinent to enumerate several miscellaneous items which are affected to some degree. These include accounts affected by collisions and derailments, loss and damage, damage to live stock, clearing wrecks and injuries to persons. The effect of car failures on loss and damage has already been mentioned. Insofar as these expenses are due to collisions and derailments, they are increased by an increase in train density, rather than by an increase in the length of the train and would therefore be reduced by the use of locomotives of high capacity.

Fixed Charges

The only fixed charges on road and equipment which appear in the operating expenses are the depreciation charges on certain parts of the plant. While the separation of interest charges from labor and material may be desirable in the general balance sheet, the analysis of the advantages of various facilities is best made by considering the net amount that can be earned above the prevailing rate of interest.

The fixed charges on the motive power seldom exceed three to four per cent of the operating expenses. The difference between the fixed charges on a thoroughly efficient modern engine and a crude design that might be bought to make an insufficient appropriation to cover a given number of locomotives is negligible. However, the difference in the earning power of these two types is quite appreciable and serves to show what large returns can be derived from the additional capital expended for refinements and accessories that give increased capacity and efficiency.

Reference has already been made to the advisability of considering the capital expenditure required for related facilities when deciding on the type of power. At first thought it might seem that the additional investment for terminals, shops and shop machinery would add greatly to the capital expenditure and the fixed charges. Under ordinary conditions the cost of roundhouse space required properly to house a locomotive is a comparatively small proportion of the cost of the power. The cost of the shop buildings and machinery is even less important when the added efficiency and decreased cost of repair operations is considered.

Sometimes the introduction of heavy locomotives necessitates strengthening or replacing bridges or laying heavier rail over certain sections. The expenditures involved are often quite large, but the relatively long life of these structures decreases the fixed charges and the additional cost per ton mile becomes comparatively small and is seldom an important factor in determining the most economical equipment. When new rail must be laid the additional expenditure is a more serious item and the charge would probably not be justified except on a line with relatively dense traffic.

The preceding discussion pointing out the more important considerations involved in a study of the economic value of various types of motive power demonstrate the complexity of the problem. Probably no absolutely correct analysis is possible; surely, it is not practicable. The question is of extreme importance because the possibilities of economical operation are circumscribed by the motive power. For that reason the choice of the locomotive should be made with extreme care. The final decision should be based on a definite knowledge of the economies that can be realized, not on unsupported opinion. Engineering methods are essential in working out the solution and the study of the problem offers a field for constructive, co-operative work by the members of the engineering societies.

Southern Roads Decline to Reduce Melon Rates

WASHINGTON, D. C.

SOUTHERN GROWERS of watermelons who have been seeking a reduction in freight rates on the ground that they are not receiving compensatory prices for their products were advised to try to obtain a larger share of the price paid by the consumer which now goes to middlemen, in a letter from Vice-President Green of the Southern Railway to Senator Harris of Georgia, who has been trying to assist the melon growers and had been instrumental in arranging for a conference between representatives of the growers and of the carriers, after a conference with the Interstate Commerce Commission. Mr. Green's letter advised that the southern roads do not feel that the circumstances warrant a reduction in the melon rates and that it is doubtful whether either the grower or the consumer would receive any benefit from a reduction in freight rates.

Mr. Green said in the letter:

Asking that you pass this advice to your colleagues who accompanied you in recent visit to my office, I beg to report that an informal conference between representatives of the watermelon growers and representatives of the carriers was had in Macon, Ga., on April 26.

From the report which I have of this conference, I am led to believe that while there was some division of opinion as to the effect of the increased transportation charge on the ability of the watermelon producer to market his crop it was probably the feeling of the majority, if not all, that the transportation charge was not an important factor in the situation.

In order that you may see at a glance what the last advance in freight charges represents—using an average load of 1,000 melons at an average weight of 27 pounds each, I invite your attention to the following tabulation. Using Albany, Ga., as a representative shipping point the advance per melon is as follows:

Baltimore, Md.	4.2 cents
Philadelphia, Pa.	4.8 "
New York, N. Y.	4.9 "
Buffalo, N. Y.	4.9 "
Pittsburgh, Pa.	4.8 "
Chicago, Ill.	4.7 "
Cincinnati, O.	2.3 "

It developed at the meeting that the returns to the growers

on last year's crop were very small, averaging about $75.00 per car and using the same estimate as above approximated 7½ cents per melon.

The last investigation into the price at destination yielded the fact that the consumer paid very much more than was warranted by the returns to the grower plus the transportation charge. For instance, it was shown that melons yielding the grower 7½ cents and the carrier 12.7 cents, Albany to Baltimore, or a total of 20.2 cents for the producer and the carrier, sold in Baltimore for $1.

It was stated at the meeting that certain carload shipments of melons from Stilson, Ga., to Chicago in last July yielded the grower approximately $50 per car. Figures were submitted from the Government report (Bureau of Markets daily market report) which showed the average sale at Chicago for melons ranging from 18 to 31 pounds during July, 1920, to have been $349 per car of 24,000 pounds, based on every other day sales. The freight rate from Stilson to Chicago during July, 1920, was $134.40 per car of 24,000 pounds and war tax $4.03, making a total of $138.43, which deducted from the average sale price left $210.57 for the grower and speculator, which it seems was divided by the grower receiving $50 and the speculator $160.57.

It is reasonably certain that the grower would not receive any substantial addition to his price through a reduction in freight rates. I do not believe the consumer would get the advantage of such a reduction.

The citrus producers in Florida and on the Pacific Coast and the Georgia peach growers long since learned that they could not get fair returns on their crops by handling through commission houses in the markets of consumption and accepting whatever return the commission man rendered. They therefore formed associations and created selling agencies which have produced much more satisfactory results. The distribution under this plan is more intelligent and glutting the markets is avoided with its consequent depression of prices.

The interested carriers wish me to say to you that they do not feel that the circumstances warrant reduction in the melon rates.

In presenting this letter in the Senate for publication in the Congressional Record, Senator Harris said it "shows the amount of profiteering going on on the part of the commission merchant and the retailer" and he had taken that phase of the matter up with the Federal Trade Commission.

Short Line Problems Discussed

WASHINGTON, D. C.

THE AMERICAN SHORT LINE RAILROAD ASSOCIATION began a two-day annual meeting at Washington on May 18. President Bird M. Robinson presented a report outlining the work of the association and the problems for the future in which he said in part:

The American people have apparently lost their sense of justice in considering the railroad question. They have, in years past, followed the cry that the public must be served regardless of the rights of the owners of the properties, and during that period have enforced a policy of restriction to such an extent that they have practically starved most of the railroads.

The government took possession of the great majority of the railroads of the country for war purposes, and after operating them in an extravagant and reckless way, returned the properties to their owners not only in a dilapidated condition, but saddled with ruinous wage contracts, which have since resulted in sapping their very life blood. When returning the roads to their owners the government gave to one of its agencies unlimited power to regulate the rates to be charged for services, and gave to another agency unlimited power to determine the wages to be paid to their employees.

The result has been most disastrous for notwithstanding a large increase in rates, the revenue received has not been sufficient, in most cases, to meet operating expenses, and as a result of such limitations and impositions, solvent companies have rapidly progressed into bankruptcy.

For the purpose of developing the facts, the Senate, through its Committee on Interstate Commerce, is now engaged in an investigation of the difficulties confronting the railroads. We confidently hope that that investigation will clarify the atmosphere and remove the smoke and poison which has been injected into the situation; and at least result in a clear understanding by a majority of the Senators and Members of the House of the true facts, and of the emergency which confronts the carriers.

In the meantime, however, a large number of bills have been introduced in Congress, not only to amend the interstate commerce statutes as amended by the transportation act, but to add new and burdensome restrictions upon the carriers. The great majority of all the bills so introduced are intended to further curtail the limited authority left to the owners of the properties and to impose additional burdens.

The parties behind these various bills in Congress are prepared to fight vigorously for their adoption and it will be necessary for the carriers to be prepared to defend themselves earnestly and strongly at all times and under all circumstances; otherwise they will be afflicted with additional burdens and restrictions.

The efforts of the carriers to break the strangle-hold of the labor unions and to reduce the amount of wages paid to employees to a degree commensurate with revenues received, has precipitated a fight that has not heretofore been equaled for misrepresentations and brutish villification. The labor leaders have not only used every device to create a smoke screen for the purpose of obscuring the question at issue, but they have vigorously sought to use poison gases of untruths in the hope that they could thus kill off the efforts being made by the carriers to save about $1,000,000 per day, which they are being forced to pay to employees beyond the amount that should be paid. Only a part of the public seem to realize that in the end it must pay this extraordinary bill, and that therefore the fight of the carriers is for its benefit, as well as their own.

The trunk roads have two very strong associations and many subordinate organizations, for the purpose of promoting efficiency and standardization and to protect their interests. While the short line railroads of the country are large in number, they are limited in mileage, and are very greatly limited in available funds. They cannot maintain more than one organization, but they can, by proper efforts and full co-operation, maintain one very strong and effective association at a cost very small when compared with results accomplished. The surrounding conditions compel that class of roads to increase and strengthen, to the fullest extent, this association, as it is the only organization available, and is the only one that has ever accomplished any substantial results for that class of roads throughout the country.

This meeting must recognize that joint and co-operative effort at this time is the only means or way by which roads of the non-trunk class can obtain protection and secure living conditions in the future. Hence the delegates should carefully consider the association as such, and adopt such plans and devise such means as will insure, not only a continuance of the efficient work heretofore done, but which will lead to greater benefits in the future.

There are about 300 additional short lines in the country that should become members, and the delegates at this meeting should consider ways and means by which these non-member lines could be impressed with the fact that they are not doing their duty to the lines that are members, especially those non-members which constantly and unblushingly take advantage of what the association does, without in any way participating in the work or rendering any assistance in accomplishing the results.

I have just made a careful review of the results accomplished by this association during the past five years, and am convinced that, taking into consideration the amounts actually obtained and recovered by the short lines of the country, or which they would have had to pay had the association not protected them in such instances as the Adamson law, and Wage Decision No. 2, together with the benefits obtained in the federal control act and from the Railroad Administration; as well as those which have accrued under the Transportation Act, but not including the $8,000,000 or $10,000,000 per year to be recovered through increased divisions, in the aggregate will be in excess of $75,000,000; and that great result has been accomplished at a cost for the whole support of the association for the last five years, which is less than one-third of one per cent of those benefits.

Circumstances clearly indicate that it is vital to the short line railroads that this association be continued. In fact, there are strong indications that the organization will be needed to a greater extent in the future than it has been in the past. It is quite apparent that the government is participating more and more in the management of the carriers, and that Congress and the legislatures will have under constant consideration the enactment of laws that will affect the carriers more and more.

J. H. THOMAS, member of the British parliament and secretary of the National Union of Railwaymen, was met on his arrival in New York on May 11 by such banners as "Thomas is fleeing the wrath of his country" and "Judas hanged himself after the betrayal. Will Thomas do likewise"? Those carrying the banners proclaimed themselves members of the "Irish American Labor League" and it is understood that their animosity toward Mr. Thomas was occasioned by the failure of his union to join the striking English miners.

Non-Interlocking, No-Stop Railroad Crossing

A Proposed Signal Layout to Control Train Movements Automatically at Intersection Points

By L. B. Porter
Assistant Signal Engineer, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.

THE ECONOMY produced by the elimination of train stops has been the deciding factor in favor of the installation of interlocking plants at railroad crossings and junctions. The large number of non-interlocked crossings, junctions and terminals throughout the country, over which thousands of trains are moved daily with a comparative freedom from accidents, proves conclusively that interlockings are not necessary from the standpoint of safety alone.

Careful studies, calculations and tests were made several years ago which resulted in the estimate that 45 cents would represent the average cost of stopping a train. With this as a basis it was felt that an interlocking plant would be a paying proposition when 20 or more train stops per day could be eliminated. Today the cost of stopping trains is much higher, but the cost of installation, maintenance and operation of a complete interlocking plant has also increased

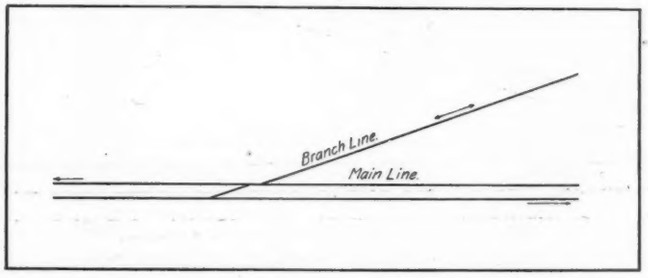


Fig. 1—Junction of Single with Double Track Line

greatly so that it will require careful estimates to prove the economy effected by the installation of a complete plant unless the traffic is quite heavy or local conditions of stopping and starting trains are unfavorable.

Substituting Automatic Signals for Interlocking

The main items of expense connected with an interlocking plant are the operators' salaries, tower supplies and maintenance of the movable parts of the plant. If these items could be eliminated there is no question but that it would pay to prevent unnecessary train stops at crossings or junctions, even though the traffic were comparatively light. Obviously it is impossible to eliminate these items and still retain an interlocking of the type which permits the passage of trains without stopping.

The question then arises: Would it be possible to substitute any other arrangement, less expensive, in place of the complete interlocking? It has been truly said that "A problem is half solved when correctly stated." The statement of this problem is: To provide a system of signal indications for governing train movements at railroad crossings and junctions, so arranged as to prevent simultaneous conflicting movements and not to require manual control except possibly during certain periods. There would be no objection to speed restrictions at these points, although the full train stop is to be avoided except where one train must give preference to another. The solution of this problem is: An automatic signal arrangement with selective controls for the signals and with certain modifications of signal circuits now in use.

The stopping of trains before reaching any railroad crossing or junction at grade is required by law, unless certain safe-guards are provided, in which event the state laws grant non-stop privileges. The following is taken from one of the state laws relating to stopping trains at crossings,—"Every company operating a railroad shall cause all trains on such railroad to come to a full stop, not less than 10 nor more than 60 rods before reaching any railroad junction or crossing at grade, unless such stoppage is rendered unnecessary by an interlocking plant *or other device* approved by written order of the commission or by the court upon appeal." The statutes in other states are usually drafted along the same general lines as the one quoted.

It will be noted that an automatic arrangement of signals may be approved at the discretion of the railroad commission and that the different forms of interlocking heretofore used almost exclusively are not the only forms of protection that could be considered. The writer knows of one state where the commission's engineer has stated that an automatic signal arrangement would be approved in lieu of interlocking protection for the ordinary simple crossing or junction. Furthermore, several actual installations of this nature have been made in other states where the commissions have given their approval and the crossing or junction stop has been eliminated.

Application of Automatic Signal Arrangement at Junction

As an example of what it would be possible to accomplish in the way of using an automatic arrangement in place of an interlocking plant, let us consider a simple junction of a single track line with a double track line such as illustrated in Fig. 1. There are numerous junctions of this kind located at outside points, away from towns, where there is no station work, and as the double track line is equipped with automatic block signals, and as the distance to stations on either side of the junction is not very great, there is no necessity for maintaining a telegraph or block office at the junction point. The traffic on the branch line is of minor importance. In some cases it is of such a nature that there would be no objection to or hardship in having train crews handle their own switches. In other cases the train movement can be almost entirely confined within an eight or nine-hour period so that one operator can handle the switches for the few train movements involved. Yet at present, a complete interlocking plant operated by three levermen is maintained—not because traffic on the branch line requires it; not because an open office is required on the main line; not because safety requires it; but because this is a junction point and the state law specifies that all trains must make the stop unless an interlocking plant "or other approved device" is provided, and the road can not afford to stop its main line trains. Were it not for the semi-automatic features of the home signals and the objections to leaving an interlocking plant unattended, the routes on the main line would be left normally lined up during the greater part of the 24-hr. period and the tower would be closed.

Bearing in mind that the interlocking now in use is not required primarily to handle the switches for the branch line,

but that its main function is to permit main line trains to pass without making the prescribed stop and to safe-guard such movements properly, would it be possible to dispense with the interlocking and use automatic signals instead? An arrangement of signals similar to that shown in Fig. 2 is suggested.

The crossover and junction switches are hand throw and are operated by operators employed on one or more shifts as conditions may require, or by trainmen if the branch line traffic permits. Signal No. 2 governs movements from the main track to the branch line and clears up automatically when both crossover and junction switches are thrown. Signal No. 4 clears up when block sections *"B"* and *"D"* are unoccupied and the junction switch is thrown. Signals No. 1 and No. 3 govern main line movements and are controlled the same as standard double track automatic block signals in all respects, except that signal No. 3 (and its distant signal) will show caution with a train approaching on the branch line in section *"C"*. The crossover and junction switches must, of course, be in the normal positions for the main line signals to clear. The selection of controls through the switches prevents the simultaneous clearing of conflicting signals and authority for the movement. If the telephone communication should be interrupted for any reason, or signal No. 4 should fail to clear, the movement onto main line would have to be made under the protection of a flag.

There would, of course, be other ways of handling the movements from the branch to the main line, such as requiring the lapse of a time interval after throwing the junction switch before a train fouls the main track so as to provide a longer overlap or a track circuit overlap might be used for the main line as well as for the branch line signal. An electric lock could be provided on the junction switch, which would be controlled through approach sections on the main track, to prevent throwing the switch with the main line train approaching. A derail might be provided on the branch line to work in connection with the main line switch and the electric lock to insure branch line trains stopping back of the fouling point. However, if proper discipline is maintained, these additional features should not be necessary.

Advantages of the Automatic Arrangement

The proposed automatic arrangement would give practically all of the non-stop advantages of an interlocking plant,

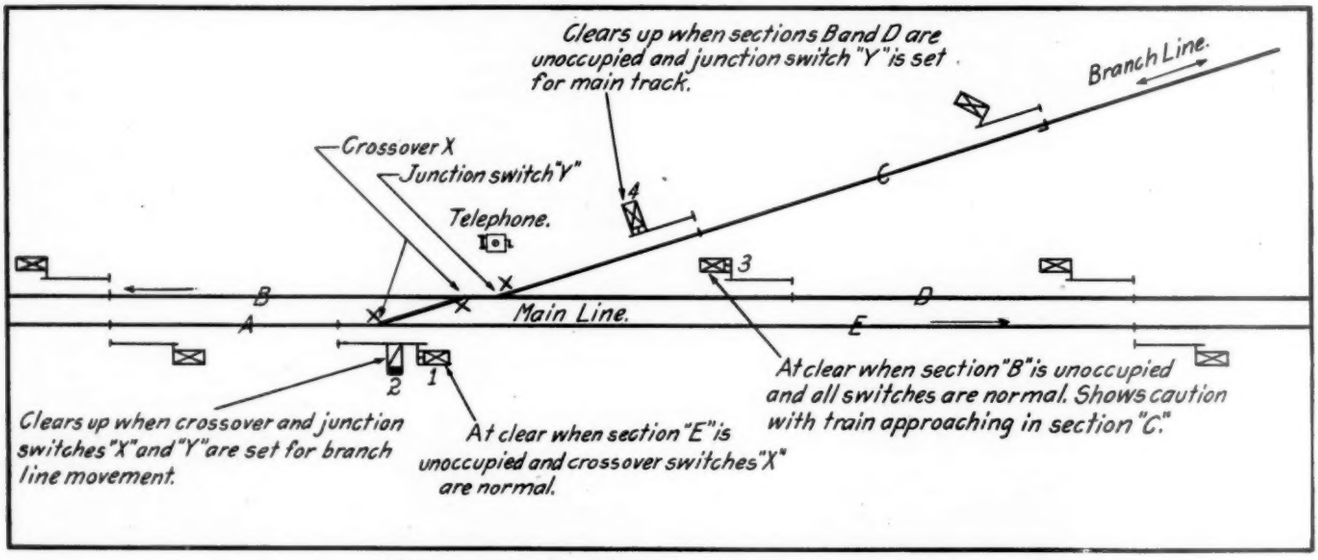

Clears up when sections B and D are unoccupied and junction switch "Y" is set for main track.
Branch Line.
Crossover X
Junction switch "Y"
Telephone.
4
C
3
B
A
Main Line.
D
E
2
1
At clear when section "B" is unoccupied and all switches are normal. Shows caution with train approaching in section "C."
Clears up when crossover and junction switches "X" and "Y" are set for branch line movement.
At clear when section "E" is unoccupied and crossover switches "X" are normal.

Fig. 2—Automatic Signal Arrangement at Junction

takes the place of an overlap. If desired, signal No. 4 could be made a normal-danger signal with a short clearing section, so that it would not clear up until a train had nearly reached it. This would have the effect of imposing a speed restriction on main line trains approaching the junction from this direction. Switch indicators would be provided on roads using this type of apparatus so as to prevent the throwing of switches in the face of approaching trains.

Trains on both the main and the branch line are operated under one dispatcher and under the same time card; therefore, a movement from main line to branch line *"A"* to *"C"* would be identical with any crossover movement in automatic block signal territory and would have the same signal protection. If the switches were handled by train crews, signal No. 2 would probably not be required. During the hours that an operator might be on duty at the junction, there would be no difficulty in taking care of movements from the branch to main line, since he would be fully advised as to main line movements. At other times trains on the branch line would get information regarding main line movements from the last open office on the branch, and before making any move to come out on the main line at the junction, would get into telephone communication with the dispatcher or operator at the main line station and first get the necessary for main line movements and at a much lower cost. It would be possible to dispense with from one to three levermen and the cost of maintenance and operation would be much lower than for an interlocking plant. A smaller investment would be required for the automatic arrangement, which would reduce the taxes, the interest and depreciation charges. Delays to traffic due to the failure of the complicated electrical features of modern interlocking plants; and delays due to the difficulty of keeping switches, derails and movable parts of a plant free from snow and ice, would be decreased. An automatic arrangement is usually more flexible than an interlocking plant. Taking all of these features into consideration, a conservative estimate of the saving would be from $300 to $800 per month in favor of the automatic arrangement, depending upon the number of men required to handle the switches.

Disadvantages of and Objections to The Automatic Arrangement

It is admitted that movements to and from the branch line may be somewhat handicapped under the proposed arrangement, especially if trainmen have to handle their own switches; but only junction points where facility in handling branch line traffic is of minor importance are being considered

in this discussion. The first and main objection to the proposed scheme perhaps would be that safety in train operation would be sacrificed, as derails could not be used with an automatic arrangement. Apparently there is a difference of opinion regarding the value of derails in main tracks. It is a well known fact that there are a large number of interlocking plants throughout the country at crossings, junctions, yards, and terminals where no derails have been provided. At some of these plants the speed of trains is high while at others it may be somewhat restricted. These plants without derails, the number of which is constantly increasing, cannot be considered unsafe by any means. On the contrary, the view seems to be gaining ground that the derails are no longer considered necessary, except at special locations. Indeed, it seems probable that derails have done more positive harm in causing unnecessary derailments when no danger existed than the good they may have accomplished in preventing accidents.

The function of the derail is two-fold: It has a moral effect on the enginemen in causing them to be more alert and ready to observe and obey the signal indication from the fear of the serious consequences of a derailment; it also per-

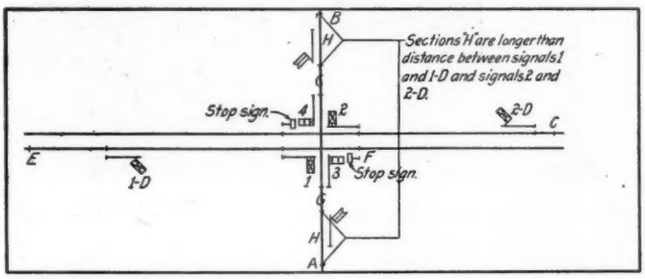


Fig. 3—Automatic Signal Arrangement at Crossing

forms the useful function of preventing possible collisions in case the engineman has lost control of his train and is unable to stop at the governing signal. It undoubtedly would be advisable always to retain the derail at certain locations where there are especially unfavorable conditions to be contended with such as a descending grade or a poor view of the signal. At such points an automatic arrangement could not be used, but it would seem that under ordinary conditions in this day of advanced signaling practice when trains are governed almost entirely by signal indications, when surprise tests are made regularly, and rules rigidly enforced, the main-track derail could be dispensed with almost entirely.

Are the chances of accident any more numerous or would the consequences be any more grave were a train to disregard an automatic signal at a junction point where no derail is used than if it should disregard a distant signal governing the approach to a signal governing over a derail; or if it should disregard the *caution* indication of an automatic signal, when running at 60 mi. an hr. two blocks behind a first-class passenger train that had stopped just out of view around a curve and the flagman failed to perform his duty; or where the automatic signal was at *stop* due to a piece broken out of a rail; or where it was due to a misplaced facing switch or an open switch point? Would the consequences be any more grave than if the engineman failed to observe a train order signal, a staff signal, or a controlled manual signal and the train proceeded on its way against an opposing train?

The argument may also be advanced that an automatic signal at a remote point is more likely to be disregarded than a manually controlled signal; also that the proposed scheme would require occasional movements to be made under flagging protection and that this could not be depended upon. Now these are conditions depending upon the discipline a road maintains, but the odds are in favor of there being no accident at the junction, especially if an operator is employed to handle all or most of the regular movements, as against the chances of an accident at an automatic signal governing movements into a station where considerable switching movements are made daily. To admit either of these arguments is to admit a fundamental weakness in the discipline that is maintained and that train operation under the automatic block signal system is not safe on such a road.

Applications of Automatic Arrangement at Crossings

The use of automatic signals to govern train movements over a railroad crossing would involve some complications not encountered at the junction point, for the reason that in most cases the line crossed is owned by another company and train operation is entirely independent on each road, there being no common time-tables in use, and trains on one road have no knowledge of the time of arrival of trains on the other road. There are train movements in four different directions to be taken care of, whereas at the junction practically two movements only have to be considered, and one of these does not involve any special features. To prevent simultaneous conflicting movements at the crossing, full track circuit overlap protection in all four directions is necessary. The complications at the crossing are more serious as the traffic becomes heavier. But there is a certain class of crossings where it would be possible to work out an automatic arrangement that, for all practical purposes and within reasonable limits, would answer the purpose.

Take, for an example, a simple crossing of a single-track road with a double-track road, traffic on the double-track road being heavy and it being equipped with automatic block signals, while traffic on the single-track is comparatively light. An interlocking plant has been installed, and is maintained by the first-class road for its sole benefit, as the single-track road would have no objection to making the crossing stop. The crossing may be at a remote point, as at the junction, and the men who operate the plant are required for that purpose solely. While the plant may handle one or two passing track switches or a crossover, this is merely incidental, as the other passing track switches and crossovers on the division are not interlocked, and the main function of the plant is to avoid the crossing stop for the trains on the double-track road. The traffic on the single-track road often is of minor importance, and in some cases it consists of the movement of one mixed train in each direction daily except Sunday. The writer knows of one case where it consists of only one regular train movement, down one day and back the next. Yet, in order to avoid stopping its trains, the first-class road has installed a complete interlocking plant, and because of its semi-automatic features and the objection to leaving it unattended, it is necessary to maintain three levermen to operate the plant continuously.

Looking at the matter from an unprejudiced and unbiased viewpoint, giving due consideration to safety, and bearing in mind the urgent necessity at this time of reducing operating expenses, it would seem possible and advisable to eliminate the derails and to substitute an automatic signal arrangement in place of the interlocking plant. If desired, an operator could be employed during the hours when regular trains on the second-class line were scheduled to arrive, who would handle the crossing signals so as to give preference to superior trains during the time he was on duty. The crossing signals would be equipped with number plates and operated as stop and proceed signals, so that there would be no difficulty in closing the office at any time.

An arrangement of automatic crossing signals for a simple crossing of the kind under discussion, where traffic on one road is of minor importance, is shown in Fig. 3. All crossing signals stand normally at *stop*. Signal No. 1 clears up when a train enters the clearing section at *E*, provided

its immediate block is clear and track sections *A* and *B* on the other road are unoccupied and signals No. 3 and No. 4 are at *stop*. Signal No. 1 is controlled through a stick relay in such a manner that after it has once cleared and the train has passed distant signal No. 1-D at clear, the approach of a train on the single-track line will cause this signal to indicate *caution* only, so as to avoid tripping the signal in the face of a train. Signal No. 1 would, of course, in all cases be controlled to the *stop* position by the track circuit between signals No. 3 and No. 4. Signal No. 2 is controlled in the same manner as signal No. 1. Signals No. 3 and No. 4 clear up when the train is on the short clearing section *G* (this control being directional), provided track sections *C-D* and *E-F* are unoccupied and signals No. 1 and No. 2 are at *stop*. No signals are provided for the reverse current movements on the double track. When such movements are made, the regular crossing stop would have to be made. It will be noted that the simultaneous clearing of conflicting signals is prevented by overlap track sections and the control of each signal is carried through normally closed controllers on all conflicting signals.

The proposed arrangement could, of course, be modified in many different ways. In case an operator is employed during certain periods, some of the automatic control features could be replaced with manual control. If desired, the crossing signals on the double track road could be controlled through short clearing sections immediately in the rear of the signal, the same as proposed for the single-track road, which would act as a speed restriction in requiring trains to come almost to a stop before the signal would clear. Or, if desired, operative distant signals could be provided on the single-track line, together with preliminary clearing sections and full overlaps on both roads.

An arrangement of similar nature could be used at single-track crossings, although it would, of course, be necessary to provide crossing signals for movements in both directions on both lines. The directional control features of absolute-permissive signaling could be used to good advantage and the circuits could easily be combined with a standard single-track automatic signal control scheme. It is not necessary to go into any of the details for the proposed layout, as the arrangement would vary, depending upon local conditions, the amount and nature of the traffic, and the standards used on the individual roads. Standard automatic signal apparatus could be used, making it a comparatively simple matter to design the actual circuits. The advantages, disadvantages, and objections applying at the railroad crossing would be practically the same as outlined for the junction point, although it is admitted that train operation at the crossing is more complicated.

Conclusions

There are numerous non-interlocked crossings and junctions where the initial expenditure for an interlocking plant would hardly be warranted, even if it were possible to obtain the necessary funds, and the cost of after-maintenance and operation of the plant would overbalance the saving resulting from its use. A study of conditions at these points in many cases would show it to be possible to use an automatic signal arrangement, thereby promoting economy and efficiency. Where an interlocking plant will cost from $20,000 to $30,000, the automatic arrangement will cost from $4,000 to $5,000. There are also opportunities for reducing operating expenses at points in automatic signal territory where plants are now maintained. The main consideration is to eliminate the derail where this can be done with safety, and to make the governing signals automatic in their operation. If this makes it possible to dispense with even one leverman or to eliminate some Sunday time, it will result in a considerable saving. In many cases the existing plant can be modified to accomplish this at a moderate cost.

A Novel Crossing Sign

THE AUTOMATIC SIGNAL & SIGN COMPANY, Canton, Ohio, has placed on the market a new type of advance warning signal for the highway approach to a railroad. The signal consists of a heavy gage steel plate 24 in. in diameter coated with metallic aluminum on which letters 5 in. high are painted in black enamel. On the bottom half of the plate, a heavy special Redflex signal lens, 12 in. square, is riveted, which is hermetically sealed in a cast aluminum case, protected by a screen. The steel plate and lens are mounted on a steel post 2½ in. in diameter and 6 ft. long, which is designed to be encased in a concrete base.

This Redflex lens is the ingenious feature of the apparatus. It is a red mirror and reflects automobile lights. The glass is constructed with a thin layer of red near the one surface

The Sign and Its Application at a Busy Highway Crossing

and light is so reflected on the several surfaces as to be greatly intensified, sending out a distinctly red beam.

It is claimed that the signal can be focused in such a manner that at night lights of an approaching automobile will cause it to be seen at a distance of 1,000 ft. or more and as the automobile draws nearer the signal becomes brighter, until it assumes the appearance of a ball of fire. The signal may be placed at any required distance from the railway crossing, usually on the right side of the highway and at a height of 5 ft. above the ground, where it acts as a regulating railway warning sign during the day. It is claimed that due to the powerful reflected red light, it penetrates fog, dust or rain at nights.

The photograph above shows the sign and its application on a highway crossing the Chicago, Milwaukee & St. Paul tracks near Chicago over which heavy automobile traffic passes.

Photo by Keystone

The Allied Customs Barrier Along the Rhine—German Officials Opening Car for Inspection by British Officer

Railway Terminal Problem Has Many Phases

Congestion of City Streets, Development of Air Rights, and Commuter Traffic Are Important Factors

THE RAILWAY TERMINAL PROBLEM will form the basis for several papers which will be presented at a joint session of the spring meeting of the American Society of Mechanical Engineers and the Terminal Committee of the Western Society of Engineers, Chicago, on May 25. Because of the many complications presented in the development of the facilities at Chicago, it has been taken as typifying the complex questions of transportation now pressing for a constructive answer as a consequence of the rapid increases in industrial concentration and commercial development. The general aspect of the problem will be outlined by J. R. Bibbins, manager of the Department of Transportation and Communication of the United States Chamber of Commerce, while various subdivisions will be discussed by others, who will take up such topics as local freighthouses and the handling of l. c. l. freight, the motor truck in its relation to the interchangeable body, terminal unification, the more intensive use of real estate owned by the railways and local rapid transit development. The following summary taken from advance papers now available reviews those features of most general interest.

The reasons for concentrating on the situation in Chicago lies in the particular intensity of the complications as outlined by Mr. Bibbins.

Outline of the Discussion

"Under the urge of European demand, the rail trunk system of today is largely concentrated in the latitude north of Chicago—St. Louis and fans out west of these points into a great collecting system of feeders. Over this great transcontinental belt travels most of the interior tonnage and the world's supply of American products. This is not simply a problem of providing continuous rail transit through a congested metropolis, but in most of these cases the gateway is a division terminal break-up and transhipment point or terminal transfer point between connecting roads, as well as a large producing district requiring carload service for incoming raw materials and both carload (c.l.) and less-than-carload (l.c.l.) service for outgoing fabricated product.

"Thus we are warranted in examining the port of Chicago, for this great gateway holds the potential place of a water gate as well as a rail head. When the possibilities are developed, Chicago will be the crossroad of the continent in fact as well as in simile, and the problem which engineers must work out in the near future is to design a proper and efficient working machine for handling quickly and cheaply this vast transcontinental tonnage as well as its own originating tonnage. The preponderance of east-west rail movement will no doubt remain, although looking well into the future it seems hardly sensible, on the ground of national safety, that over one-half of the nation's export production should be passed through the 'bottle neck' of New York harbor."

Suggested Methods for Expediting Transportation

Mr. Bibbins also calls particular attention to the fact that while Chicago has an area of over 200 square miles, the business center occupies only about one square mile and all of the railroads have located most of their local freight houses within or just as close to this area as possible. Another complication lies in the interchange of a large volume of less than carload freight between the railroads by trucking over the congested city streets.

In the main, the discussion will center on the expeditious handling of less than carload freight and the subject will be approached from a number of different angles. E. J. Noonan, engineer, Chicago Terminal Commission, Chicago, advocates the more intensive use of property occupied by the railroads for the local freight development. His plan embodies primarily the use of the two-level freighthouse with the cars on a lower level and teaming or street vehicle service on an upper level in the same horizontal plane as the city streets. But owing to the high value of real estate this is not enough. The railroads must develop their properties in such a way that multiple story buildings may be erected over the facilities used for purely freighthouse purposes so that it will not be necessary to allocate all of the land rental or interest in land investment to the freight handled through the terminals. Mr. Noonan estimates that the single-level type of freight house with its accompanying tracks can be provided for about $2 per sq. ft., and the double-level type for about $5.

With these figures as a basis the relative economy, so far as interest on land used is concerned, is as follows:

	Assumed value of land per sq. ft.			
	$5.00	$10.00	$15.00	$20.00
Interest charge per ton at 6 per cent, single-level	$0.42	$0.72	$1.02	$1.32
Interest charge per ton at 6 per cent, double-level	0.30	0.45	0.60	0.75
Saving, cents per ton	$0.12	$0.27	$0.42	$0.57

Mr. Noonan's solution of this problem hinges primarily on the development now proposed for the rehabilitation of railway facilities immediately south of the business center of the City of Chicago. This was described at some length in an abstract of a report recently issued by the Chicago Terminal Commission appearing in the *Railway Age* of April 8, 1921, page 891.

Plans for the Interchange of Freight

Improved means for the interchange of freight between the railroads is discussed from two angles. Mr. Bibbins and Mr. Noonan have considered this from the standpoint of the possibilities of the freight tunnel of the Chicago Tunnel Company, and present data abstracted largely from the report made by Mr. Bibbins as supervising engineer for the Arnold Company to the Chicago Plan Commission last year. Excerpts from this report appeared in the *Railway Age* for July 9, 1920, page 52. This is obviously a problem peculiar to the City of Chicago of no direct bearing on the freight handling in general. However, the existence of this tunnel, which now handles 1,800 tons of l. c. l. freight daily and could possibly accommodate 10,000 tons, points to the thorough consideration of this tunnel as the transportation agency in the solution of the city's problems.

The motor truck as an agency in the solution of this problem is discussed in a broad way by Hugh E. Young, engineer, Chicago Plan Commission, Chicago, who points out emphatically the necessity for taking into account the fixed charges and maintenance of highways and streets used by the trucks. Mr. Young's paper is abstracted as follows:

"Before the motor truck replaces trap-car service in order to relieve the rail terminals of local car-movement congestion, investigation should be made to determine if a scientific handling of freight by modern terminal equipment and the employment of such schemes as those adopted in Cincinnati where package freight is loaded into demountable containers, or truck bodies, which are transported to and from motor chassis mechanically, can accomplish the same results. The

principal factor contributing to the local car congestion is a lack of modern terminal equipment.

"In reports from Cincinnati much has been said of the advantages of motor trucks for interchange between terminals and transport between main station and substation, but the effect of such traffic on the maintenance of highways, and the loss to the public due to street-traffic congestion, are not considered in the accounting.

"The tendency in the trucking business toward handling a large freight-transfer tonnage wholesale by contract has developed within late years. Quite recently a new plan has appeared, using standard two- to five-ton motor trucks built with interchangeable bodies so that the more expensive chassis may be kept in continuous operation. Thus house or shippers' freight can be loaded and unloaded in these unit containers as required, independently of the truck itself or its time of arrival and departure. It is even proposed by advocates of this system that motor trucks should replace trap-car service as now operated, thus relieving the rail terminals of much local movement.

"This contract motor-transport plan has advantages, some very real and some apparent. It aims to reduce street congestion by concentrating bulk, and, by maximum loading, reduce the number of motor trucks on the public streets required for freight service. It provides greater latitude in timing of various transport movements, so that individual shipments can be handled with greater ease and less confusion at the freight houses.

"However, for the Chicago situation the fact should not be lost sight of that any plan of motor transport, whether individual or by contract, is defective if the downtown public streets are used as a right of way for a class of traffic which is primarily rail tonnage and should be considered as such. Loop streets are now all too few and narrow, without deliberately planning for their further use for transporting railroad tonnage.

"The importance of legitimate highway transportation has been overlooked in a remarkable manner when it is considered that all movement of produce in the course of its production from raw material to finished product, starts on the highways and finishes over the highways. As a method of transportation incident to railroad transportation and as a solution of the short-haul problem, it far outranks in importance all other means of transportation.

"Recognizing the necessity of the rail carrier, realizing that the prosperity of the country depends on railroad transportation, considering the present difficulties of railroad financing, and knowing the economic waste in duplicating transportation systems for the same business, it is absurd to assume that in the final accounting there is a saving to the consumer in motor-truck delivery. Neglecting the cost of construction and maintenance of highways, which cost more per mile than railroads, and even if commodities were delivered free of charge by the motor truck, the public must still pay a return in some manner or other on the rail investment if it expects to have such a utility maintained and operated, otherwise it will be a case of dismantling the railroad. This latter procedure is already being threatened by one railroad.

"The use of the motor truck for interchange between terminals and transport between main station and substation before being accepted on its face value should be investigated as to its economy, taking into consideration the cost of maintenance of the highways over which it operates; and any plan of motor transport, whether individual or by contract, is deficient if downtown public streets are used as a right of way for a class of traffic which is primarily rail tonnage."

In concluding his paper Mr. Young contends that the ultimate economic application of the motor truck probably lies in storedoor delivery and outlines the more general details involved in the application of this system through the use of demountable bodies or containers. Particular emphasis is placed on the fact that the introduction of this system would entail a very extensive reconstruction of the local freight house facilities.

Terminal Unification

J. H. Brinkerhoff, general agent Northern Pacific, Chicago, who was Chicago terminal manager for the U. S. R. A., discusses the unification of terminals from the viewpoint of the terminal executive.

"About the time this country entered the war the situation in Chicago was such that it was necessary for some action on the part of the interested lines, and as a result a co-ordination committee was formed and a great deal of good was accomplished through the efforts of this committee.

"When the railroads were taken over by the government in December, 1917, this committee's meetings were discontinued for a time, though the changes that had been put in effect by the committee were in operation. The committee's activities were resumed in the spring of 1918 and they continued to function until July, 1918, when the Chicago terminal district was formed, and the work of the committee was taken over by the terminal manager.

With the operation of the terminal under one head many things were accomplished in the common use of the terminals. In this district there are a number of routes over which cars can be handled to and from industries and between railroads; this is particularly true of the movement between railroads. Economical operation and prompt movement of cars is greatly facilitated when the handling of commodities is concentrated in one channel. This is best illustrated by the concentration on one line that was accomplished in the handling of perishable freight, a large part of which requires re-icing. The result of this concentration gave the switching line an opportunity to handle the cars in large groups and facilitated the outbound movement.

"The Chicago district has become the most important junction point between the east and west and the supply of certain classes of equipment during times of heavy business is not sufficient to take care of the movement. The preponderance of tonnage which requires box cars, particularly grain and grain products, is largely eastbound. This makes it necessary to move empty box cars west. The product of the steel mills requires a large proportion of open top cars, and while the western lines are equipped to handle coal, they are not provided with the type of equipment necessary to handle the products of the steel mills so there is always a use in the Chicago district for the eastbound open top equipment which moves west and this requires in some cases empty open top movement into the district from the west. The distribution of equipment under these circumstances is best handled by one authority. The handling of a terminal where there is a large variety of interests is best accomplished by having it under one head whose authority should be supreme in deciding questions that continually arise between individual carriers.

"In the use of local freight stations those stations that were congested were relieved by sending business to freight stations that were not so busy. This practice kept the terminal open and made unnecessary the placing of embargoes.

"The consolidation of the 21 individual agencies at the Union Stock Yards was effected and the Stock Yards District Agency now handles, from an operating standpoint, business for that district. This furnishes the shippers one point of contact instead of 21, and has been very satisfactory. Few people are aware of the magnitude of the business handled by this agency. The remittances to the various lines interested amount to about $75,000,000 per year.

"What was accomplished by unified operation was further illustrated by what happened in August, 1918. During a

period of two weeks there was a total of 21,693 cars of grain handled. This is the greatest volume that has ever arrived at the primary market in a similar period of time. There was also forwarded during this same period over 19,000,000 bu., part of it going by lake. No embargoes were placed, and congested individual lines were relieved promptly.

"Congestion always starts at one point and if prompt measures are not taken, the congestion spreads to other lines. Under unified control, measures can be taken to relieve congestion as soon as it is manifest. Under individual operation this has never been accomplished."

The Steam Railroads in Rapid Transit Development

A paper by Bion J. Arnold, consulting engineer, Chicago, upholds the more intensive use of railway property as the solution of the local rapid transit problem which has been agitated for a great many years primarily in the proposal to construct subways according to a number of different plans. Mr. Arnold shows that the passenger development as carried out according to present tendencies involves the construction of enormous passenger stations, entailing capital charges against the passenger traffic entirely out of proportion to the revenue which can be expected from suburban service. He also called attention to the fact that the present development provides for no direct interchange of passenger traffic between railroads or between routes occupied by the several roads.

"None of these, with the exception of the Illinois Central development, is especially adapted for the economical and quick handling of commuter or rapid-transit business. On the other hand, they are distinctly ill adapted for handling the large growth in future traffic which will undoubtedly come. While these stations are distributed around the borders of the most intensively developed part of the business district, there is no intercommunication between them and consequently these terminals must necessarily remain as traffic "dumps," rather than as traffic distributers.

"The statement is frequently made by railroad executives, and without refutation, that the commuter rapid-transit business does not pay or is carried at a large loss which must be made up by the long-distance overland passenger and freight business. If this is true, the railroad managements of the country which are confronted with the problem of adequate revenue, stand in the inconsistent position of harboring a passenger-terminal system and conducting a public service at the expense of the stockholders or the other patrons of the system. Either aspect, if true, represents an unstable economic condition which cannot last. And if the commuter traffic is not in fact supporting the full cost of producing this service, there is no better time than the present for the railroads to establish the facts in the case and endeavor to have this traffic handled in a more practicable manner. It is believed by many engineers in railroad service and in civil life that some careful and thorough research into the economics of railroad suburban-passenger business should be instituted at once, with the specific object of finding out whether the railroads could better handle it or should turn it over to some other agency better organized for the purpose."

The American Railway Development Association

Helping the Farmer and Showing the Farmer How to Help Himself—Some Unanswerable Questions

A part of the doings of this association at its annual meeting in New York City on May 11, 12, and 13, was reported in the *Railway Age* of May 13, page 1129. The first business on the second day, Thursday, was the election of officers, which resulted as follows: President, G. E. Bates, assistant to the general manager of the Delaware & Hudson, Albany, N. Y. Mr. Bates heretofore was second vice-president of the association. First vice-president, J. B. Lamson (C. B. & Q.), heretofore secretary-treasurer. Second vice-president, J. F. Fox, traveling immigration agent of the Northern Pacific. Secretary, J. F. Jackson, agricultural agent of the Central of Georgia, Savannah, Ga.

A large number of new members were admitted to the association, representing twenty or more prominent roads. Denver, Colo., was selected as the place for the next annual meeting, to be held in May, 1922. A motion was made, and unanimously carried, that the date of the semi-annual meeting, which is held at Chicago and comes in November, might be changed so as to make it convenient for members to attend, on the same trip, the International Livestock Show.

Helping Farmers and Others to Advertise

Methods and scope of publicity was the subject of a paper by J. D. McCartney, assistant general passenger agent of the Central of Georgia, who, however, proved to be a publicity agent; he pays as much attention to the shops and the agricultural department as to the direct cultivation of passenger traffic. The publicity agent should do everything in his power to promote the "public be pleased" theory of conducting transportation. Cultivate the weekly as well as the daily press. The development agent should remember that every day he has interesting news to give out; see that the publicity agent of your road is informed about it. On the Central of Georgia, the president of the road, each month, issues a circular to subordinate officers containing a memorandum of subjects worth talking about, with a view to giving the public useful and accurate information. Every railroad officer must remember that the day has gone by when he can excuse himself for inaction by saying that he is not a good talker. Good talkers are now somewhat common, and it is the duty of everyone to see that he does his duty in that direction.

In the discussion on this paper, Mr. Bates (D. & H.), calling attention to the fact that "public be pleased" was not so snappy a slogan as "public be damned," suggested that "P. B. D." could still be used by making it read "public be developed."

Co-operation in Community Advertising

This was the subject of a paper by W. H. Hill, agricultural agent of the New York Central, at Chicago. The railroads should co-operate with the Community development section of the Associated Advertising Clubs of the World. These clubs are made up largely of the merchants in a given town, often a town of moderate size, to work together in the promotion of retail trade. Mr. Hill cited a notable example, that of the Maryville (Mo.) commercial club, and displayed samples of whole-page newspaper advertising which was used to promote the retail business of that town in the country immediately surrounding it; also the case of St. Louis, Mo., which advertised all over the country with a view to drawing to that city 16 different kinds of manufacturing. The speaker cited various cities which had been notably successful in

advertising: Winnipeg, Man., Asheville, N. C., Omaha, Neb., and others. A good deal of money used in experiments of this kind is unwisely spent and railroad development agents would do well to take a hand in these enterprises where opportunity offers. The railroad development agent should investigate to see whether or not he could aid the towns on his line. It will pay to transport local committees to your territory to recommend the idea to towns which have not yet made themselves acquainted with it. This means of community development has been successful in rural districts where no large town was interested; for example, on the Mackinaw division of the Michigan Central.

The Neosho Development Plan

G. R. Lowe, of Neosho, Mo., by invitation, gave an interesting talk on the Neosho community development plan, illustrated with charts. The merchants of Neosho, to stimulate their retail business, went among the farmers in the territory tributary to the town and induced them to get acquainted with each other by attending a monthly meeting, this meeting being made attractive by an auction, so managed that those attending it would have a good prospect of making a dollar. The farmers come to these auctions month after month. Having got these people more thoroughly acquainted with the town, the merchants adopted a "golden-rule sale-day"—every Monday—in which each merchant gave a specially good bargain in some one commodity. These sale-days were advertised on Friday and Saturday. Then, further to get the people of town and country acquainted with each other, meetings in the country, of the nature of a picnic, were held monthly throughout the summer; and these were attended largely by people from the towns.

The Farmer's Viewpoint

What the farmers want of the railroads was the subject of an address by S. L. Strivings, of Castile, N. Y., president of the New York State Federation of County Farm Bureaus. Mr. Strivings spoke for farmers in New York state, who—like farmers everywhere—desire good service, low rates and economical railroad management. Setting forth the fundamental truths of transportation economy, points on which both railroad men and farmers can agree, Mr. Strivings described in striking language some of the evils which must be eliminated. Some of these evils are of a kind for which neither farmers nor railroad men are responsible, but the speaker called on the railroad men to co-operate in having them cured. Like Mr. Benson, who spoke on the previous day, Mr. Strivings emphasized the difficulties of getting men to go on to the farms when they have been brought up in a less strenuous life. He characterized Secretary Lane's proposal for colonizing soldiers on the farms as a dream, and nothing more. The farmer in hiring help has to compete with the railroads, and even may have to come to the eight-hour day; yet he cannot recover excessive costs by increasing the cost of his products. The price of wheat in America is decided in the market of London and there is no help for it. Co-operation in getting just laws concerning the relations of capital and labor, and in avoiding extravagant expenditures on national highways, were two points on which Mr. Strivings bespoke the aid of the railroads.

Marketing Fruit

Developing small town markets was the subject of an interesting paper by C. B. Michelson of the St. Louis-San Francisco. By persistent industry Mr. Michelson enlarged the market for apples for the shippers along his line by promoting shipment to the smaller towns—where the farmers theretofore had confined their efforts to the large places.

F. S. Welsh (N. Y. C.) read a paper further discussing how to market fruit with the best results. The inspectors of the New York Central pay special attention to the discovery and correction of all causes of loss on the road. They inspect cars as well as fruit. They have automobiles, and with these go around and get in close touch with the growers. These inspectors are college boys who have had experience in raising fruit and also in marketing. The shipping-point inspectors, as well as those at destinations, have succeeded in pleasing customers to the extent that one prominent consignee takes the road's record in case of loss or damage, presenting his bill in blank, for the road to fill out with the right sum.

Referring to complaints of New York shippers that in 1920 they were short of cars, Mr. Welsh asked members about conditions in other regions; and was informed that there was a considerable shortage on the Denver & Rio Grande. In Georgia, there was a short crop so that the shortage of cars was not so seriously felt. On the Canadian Pacific, stock cars were in some cases used for fruit, these cars having the slats close together. From Florida, large quantities of strawberries were moved north in refrigerator boxes.

Colonization Advertising

Colonization advertising was the subject of a paper by Jesse M. Jones (S. A. L.). Mr. Jones discussed briefly the value of a new settler to a railroad; it has been variously estimated at from $300 to $2,500 a year. In a certain newspaper campaign, Mr. Jones received 10,000 inquiries, and gave the inquirers detailed answers; telling them not only what to do, but what places and things to avoid, as being not adapted to benefit them.

Agricultural Development on the C. P. R.

Agricultural development on the Canadian Pacific was discussed by Thomas S. Acheson, general agricultural agent of that road at Winnipeg. The building up of the Canadian Pacific since 1881 by the sale of its 20 million acres of land was described in interesting fashion. In dull times the company had to accept payment for land in wheat, allowing 50 cents a bushel even when the market price was down to 37 cents. The company even advanced money to farmers to pay their taxes. The Canadian Pacific has never had to evict a buyer of its land. The company has irrigated, in Alberta, 743,000 acres of land, at a cost of $17,000,000.

Potatoes and Yams

Storage of potatoes on farms, to stabilize the market, was described by E. T. Reed (C. B. & Q.). The problem of the potato farmer is to sell his product early and get a good price, or else store until the following year. After August 1, the price, in Colorado, goes down but the potatoes left in the ground gain in weight. Usually it is not profitable to store unless the potatoes are kept until the following May or June. In the past year, storing was not profitable, but in the year before it was. In reviewing a period of thirteen years, eight years were found to have been profitable. If 75 per cent of the farmers would provide storage room for two-thirds of their product the market could be successfully stabilized.

The same general principles apply in the case of grain. In Kansas and Nebraska the farmers last year built more grain storage space than in several years before, being led to do this by the shortage of cars; and, indeed, the car shortage was a blessing in disguise. For the past four months the movement of grain has been steady.

A careful and detailed essay on the cultivation of potatoes, by F. Benz, agricultural agent of the Northern Pacific was listened to with marked interest.

Discussion by other members brought out the fact that Mr. Benz had produced highly successful potato crops. The importance of using the best seed was emphasized by a number of members; for this purpose potatoes must not be allowed

fully to ripen. C. L. Smith (O. W. R. R. & N.) had proved repeatedly that potatoes grown in a northern climate, where they could not fully ripen, produced, in warmer regions, two or three times as large a crop as seed which had been fully ripened.

The importance of encouraging northern people to eat more sweet potatoes was set forth in a paper by J. W. Firor (A. B. & A.). Growers in Georgia and South Carolina are increasing their shipments of this product; but the best kinds (sometimes called yams) are not appreciated because most people do not know how to cook them properly.

The value of livestock in promoting diversity of crops and agricultural prosperity in general was the subject of a paper by R. R. Walker (M. K. & T.).

Careful attention to pure bred livestock not only promotes good farming, in obvious ways; it is good for the farmer socially: it promotes the happiness of his children and tends to general prosperity. The dairy industry on the M. K. & T. is rapidly increasing.

Friday

The final session, on Friday morning, was devoted mainly to an address by George E. Roberts, vice-president of the National City Bank, New York City, who made a stirring appeal for close attention to the fundamental elements of right relations between carriers and the public. The railroad, in many cases, is in the position of a non-resident landlord, and therefore must put forth unusual efforts to keep the people in its territory informed of its motives; to keep them well enough acquainted with the officers of the road to deal frankly with them, and persistently warned against unsound economic and social views. The members of this association, who are to develop, not railroads, but the railroads' neighbors, are in a fortunate position, for they can emphasize the things on which the railroad, the farmer and the shipper already agree. Europe is "coming back," and will produce food for herself; the American farmer, therefore, inevitably suffers, and we must suffer with him.

In the long run, the farmers and the rest of us must get on to the same economic level. Our virgin lands were pretty well exhausted by the end of the nineteenth century, and since then the cost of living has necessarily gone up. Today we cannot live, as we formerly did, by so freely using up the accumulated wealth of the past. What society has gained by the improvements of science and machinery has been largely offset by the higher cost of food. This cost must further increase except as methods of production are improved. The railroad corporations are doing the right thing to use their money to investigate and popularize the inventions of the few, the scientific men, for the benefit of the multitude, the producers.

The attendance at the meetings was about 100. On Friday afternoon a part of the members went on sight seeing trips around the city and others visited the immigration station on Ellis Island, New York Harbor.

At the banquet of the association on Thursday evening, Robert S. Binkerd, assistant to the chairman of the Association of railway executives, New York City, made the principal address. Mr. Binkerd said in part:

"We are now in that part of our war chapter which should be entitled 'Paying the Piper.' It is a time which demands in the largest degree patience, good temper, courage and clear sight.

"It is important that we should not be downhearted. We shall get through all this on to solid, firm ground again. It is also very important that we should know just exactly what is the matter. Those who do not know what is the matter, or knowing it refuse to act on it, contribute to making the difficulties a little bit worse. Under normal circumstances our machinery of production works about two days a week for the rest of the world and about four days a week for our own domestic needs.

For the time being the rest of the world can take little of our products. So far as our domestic requirements are concerned the farmer has been compelled to take the largest and most rapid liquidation—much greater than that which has yet been taken by urban labor and the manufacturing industries generally. As a result the farmer's purchasing power is greatly decreased and commerce and industry are moving at relatively low speed."

Industrial Section

Those members of the association more particularly interested in manufacturing industries, as distinguished from farming, held two separate sessions, discussing matters connected with their own work.

J. M. Mallory, industrial agent of the Central of Georgia, acted as chairman. G. W. Curtis, industrial agent of the Canadian Pacific, read a paper describing practice, in this field, on his road.

The practice of railroads in all parts of the United States in connection with industrial side tracks was a principal topic of discussion, various proposals being offered looking eventually to standardization of contracts. Among the questions considered were: the advisability of charging for cost of making surveys on private property; apportionment of cost of track renewals; co-operation of two or more roads in industrial tracks and length of refund period on industrial sidings. A resolution was passed authorizing the president of the association to appoint a special committee to deal with this subject.

Labor Board Will Reduce Wages on July 1

IN A STATEMENT issued on May 17 the Labor Board announced that on June 1 wage reductions, effective July 1, would be announced affecting the employees of all roads which filed wage disputes with the Board before April 18. Cases filed with the Board since April 18 and prior to June 6 will be heard on the latter date and the decision in these cases will become effective also on July 1. There was no intimation of the extent of the wage decreases which will be put in effect. The Board stated that "prevailing conditions justify to some extent, yet to be determined, a readjustment downwards" of railway wages.

The Board also announced a new and complete classification of all railroad occupations which is still unpublished and which has been made effective as of April 18 by the Interstate Commerce Commission. This classification is to be used by the carriers in reporting the service and compensation of their employees to the Commission and the Labor Board. The Board said of this classification:

"The occupational classification is not considered by the Board, nor should it be considered by the railroads or other interested parties, as setting up jurisdictional lines for occupations or as limiting the kind of work which employees may perform or the duties which they may assume.

"In preparing the classification the Board has not aimed to standardize for any railroad occupational duties assigned to, or in the kinds of work performed by, its employees and nothing in the classification could be construed in this light."

The various positions are grouped in the occupational classification under 17 major "services," these services having been set up according to the general railroad functions as well as the special and peculiar requirements in railroad organizations. The services are subdivided into 119 groups. Within the groups are separate grades and distinctive class

titles, each of which is provided with a description of the duties generally performed and illustrative examples of pay roll titles.

On May 18 various representatives of railroad labor were said to be planning an appeal to the courts if radical wage decreases were ordered by the Board.

Outside of the executive, official and staff assistant service, which is ungraded and unclassified and in which examples of positions are shown separately under appropriate groups but not distinguished as to importance and responsibility of the work performed, there are 500 distinctive classes distributed under the remaining 16 services. The classification of railroad positions as developed by the Board is made up of the following distinctive parts: (1) An introductory statement showing the needs, purposes and general features of the classification; (2) Rules governing the preparation of reports; (3) Detail on divisions for reporting information on railroad employees; (4) Outline and index of railroad occupational classification; (5) Occupational classification of railroad positions; (6) Alphabetical list of and index to occupational classification and reporting divisions.

"Geer" Letter False

With the admission by Frank P. Walsh, attorney for the unions before the United States Labor Board, that the letter alleged to have been written by I. W. Geer, general manager of the Pennsylvania, Southwestern Region, to supervisory employees, and offered as evidence before the board on March 22, was not authentic and had not been authenticated, the letter was branded as fictitious and fraudulent, and this hearing came to a close on May 12.

This letter, alleged to have carried instructions to ascertain the position of employees on proposed reduction of wages resorting to "defamation of all labor organizations if necessary," was first offered to the board during the cross-examination of W. W. Atterbury, vice-president of the Pennsylvania, on the subject of national agreements on March 22, and at that time Mr. Walsh stated that the letter would be authenticated. At the hearing on May 12, Mr. Walsh and B. M. Jewell, in behalf of the employees, refused to present witnesses to substantiate this claim after cross-examining five Pennsylvania officers and employees, including Mr. Geer, who testified that no such letter, or any of similar purport, had ever been sent out by Mr. Geer, or any other officer.

The board then went into executive session and adopted a unanimous resolution calling upon Mr. Walsh and Mr. Jewell to produce witnesses to show the origin and authorship of the letter. The board ruled it to be in the public interest to have such information, its resolution reading as follows: "The board, through its chairman, requests Mr. Walsh, counsel for the employees, and Mr. Jewell, their representative, to present to this board, evidence of the origin and authorship of the letter in question. It is the sense of this board that the representatives of the employees owe it to themselves and to the organizations which they represent, as well as to the carriers and the public, to make known how and from whom this letter, evidently fictitious and fraudulent, came into their hands.

"It is not deemed necessary by the board to pursue this collateral inquiry further upon its own initiative or to compel the production of such proof, but the board contents itself with expressing thus to the said representatives of the employees its conception of the ethics of this matter."

Mr. Walsh in reply said, "The only thing we could hope to bring out by further testimony, would be hearsay or double hearsay evidence. We could not substantiate the letter. As representing the labor organizations I do not propose to pillorize the person from whom this information came to us. The witnesses we have here would protect that person. I desire to protect that person also. I will not be moved from my determination."

Annual Report of the Bureau of Explosives

MANY INTERESTING DATA on the handling of hazardous commodities are contained in the annual report of the chief inspector of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles for the year 1920, which has just been issued. To one unfamiliar with transportation conditions, it would naturally seem that the shipments that would cause the greatest damage would be those containing high explosives. It is interesting to note that the loss per ton for nitric acid and "strike anywhere" matches is considerably greater than for either high explosives or black powder. The greatest losses from any single commodity are those resulting from the transportation of gasoline, due principally to the large volume of the shipments.

The actual total loss for the year 1920 amounted to $1,090,806 for all kinds of dangerous articles. This is a decrease of over half a million dollars compared with the previous year. Nevertheless, the report states that the majority of the 1,977 accidents resulting in this loss should not have happened, as they are due to carelessness or ignorance that should not have existed. Particular interest attaches to the statistics regarding transportation of gasoline, as the losses due to these shipments are greater than from any other single commodity. The total loss from this cause has been decreasing in recent years. In 1918 it was $900,-106; in 1919, $691,635, and in 1920, $351,262.

A comparison that has not been made in previous reports is shown in a summary of reported losses compared with the total production for several important commodities. The statistics for 1920, which are typical, show that the loss per ton was as follows:

Nitric acid	$1.71
Matches	.51
Black powder	.19
Charcoal	.08
Gasoline	.02
High explosives	.00

In discussing the importance of education, the chief inspector mentioned the good results secured by the organization plan prepared by the bureau for the purpose of interesting and educating railway employees in the regulations, which has been adopted quite generally by the railroads.

The glass carboys in which acids are shipped are not sturdy containers, and many accidents are caused by breakage of these vessels. Recently an attempt has been made to prescribe suitable tests for carboys, and this work is outlined in the report.

The review of tank car matters points out that the casualties in gasoline tank car fires were reduced in 1920 to no deaths and 6 injuries, as compared with 2 deaths and 28 injuries in 1919. A review of the work being carried on by the bureau in connection with the A. R. A. tank car committee and the American Petroleum Institute is given. This pertains particularly to improvements in the bottom outlet valve, the dome closure and the safety valve.

The concluding section of the report is devoted to a discussion of the detailed work of the bureau. Numerous statistical summaries are given and circulars issued during the year are collected and reprinted.

Results for First Quarter, 1921

Tabular summaries of accidents occurring in the transportation of explosives and other dangerous articles during the first quarter of 1921 are shown in accident bulletin No. 51 of the Bureau of Explosives. The most serious catastrophe during this period was the casinghead gasolene explosion at Memphis, Tenn., on January 24 which caused thirteen deaths and a property loss of about $150,000. The bulletin also includes suggestions on reporting violations of the regulations, accidents, damages, etc., and describes several accidents, notably a fire caused by loading pyroxylin plastic articles against steam pipes in an express car.

Railroad Hearings Before Senate Committee

Daniel Willard, A. H. Smith and Julius Kruttschnitt Explain Reasons for Present Condition of Railroads

WASHINGTON, D. C.

QUESTIONING of Julius Kruttschnitt, chairman of the Southern Pacific, by members of the Senate Committee on Interstate Commerce in the railroad inquiry hearings was concluded on May 16 and Daniel Willard, president of the Baltimore & Ohio, appeared as the second witness for the railroad executives. Mr. Willard had a prepared statement, in which he said in part:

Conditions of Railroads Result of the War

The condition of the railroads at the present time differs only in degree from the conditions generally surrounding all business activities, and is the direct result of the economic changes brought about by the war. During the war we had in this country a condition of unprecedented business activity accompanied by an equally unprecedented increase in wages and material prices. Those engaged in private enterprises were generally able to so adjust their affairs, including their selling prices, as to enable them to operate at a satisfactory profit, notwithstanding the higher costs. The case was entirely different, however, with the railroads.

For 26 months the railroads were operated by the President or his representative, acting under authority granted as a war measure, and for no other purpose. During that period the roads, or at least many of them, were operated with entire disregard of their interests as independent properties. Notwithstanding the largely increased cost of operating the roads, the director general did not increase the rates and fares proportionately, and consequently the railroads while under federal control were operated at a loss, the deficit being made up out of the federal treasury.

This policy of the director general may or may not have been wise, but in any event it contributed largely towards bringing about the confusion of thought and general misunderstanding of the railroad situation which now exists. Congress, with a full understanding of the matter, enacted the Transportation Act of 1920, which provided for the termination of federal control, and was intended also to provide a basis for the successful operation of the roads by their owners in the future.

I take it that it is the purpose of this committee, among other things, to inquire into the operations of the carriers under the terms of the new act, and I am glad of this opportunity to be heard in that connection.

The Transportation Act

It has been claimed by some that the railroads under private management cannot be operated so effectively as a whole, and consequently cannot perform as large a measure of service for the public as could be done with the same facilities under federal ownership or control. The fallacy of that argument is clearly demonstrated by the fact that during the year ended December 31, 1920, the more than 1,800 independent railroad companies in this country, reporting to the Interstate Commerce Commission, were able to so co-ordinate their efforts that they handled during the year 9,000,000,000 net ton miles more than they ever handled before in the same length of time. This effective co-ordination on the part of the carriers was made possible by the Esch-Cummins act.

Many in the past have feared that private ownership of the railroads might fail as an economic policy because of the inability of the carriers to secure the adequate rates for the service which they perform, and on that account be unable to provide the new capital necessary for additions and betterments. Congress was fully advised concerning this phase of the problem and the capital needs of the carriers, and realized also that the necessary new capital could not be obtained unless the credit of the road was sound and on a satisfactory basis. The provisions of the Transportation Act with respect to the rate of return may appear academic at the present time. However, the principle recognized in the act with respect to the assurance of reasonable return upon the value of the transportation property devoted to public use has encouraged the owners of railroad securities, and in my judgment has been a most helpful influence in sustaining the credit of the carriers during a very trying period.

To my mind the labor provisions of this act afford a reasonable assurance to the railway employees that they will at all times and under all circumstances receive just and reasonable wages and be granted just and reasonable working conditions. While this part of the act has been somewhat criticized, it can at least be said that by virtue of the act we have had continuity of service during the critical period of 12 months since the termination of federal control, during which time one of the most complex labor problems that ever confronted the railroads was being slowly worked out and adjusted.

Operating Results and Expenses—1920 Compared with 1919

While subject to certain interruptions, because of strikes in the coal and steel industries, the railroads during the year ended December 31, 1919, handled a large volume of tonnage and an exceptionally heavy passenger traffic was also moved, much of it incident to the demobilization of the military forces, which traffic was handled with a lesser train mileage than would be satisfying to the public under normal conditions, resulting in decided economies in the operations for the year 1919. Furthermore, the full effect of the wage advances and changes in working conditions granted by the director general in the latter part of 1919 were not reflected in the operations of that year. These increases were in effect during the entire year 1920, and in addition thereto the award of the United States Labor Board was in effect for eight months, resulting in an average increase in rates of pay in 1920 over 1919 of something more than 20 per cent.

The properties were returned at March 1, 1920, in a somewhat depleted condition, particularly as to equipment, due in part to war conditions in 1918 and in part to an evident desire in 1919 to control and reduce maintenance expenditures. During the months January to October, 1920, there was a persistent and urgent demand for increased service, consequently every effort was made to accomplish essential repairs and to make available all equipment possible. Notwithstanding the decline in business in November and December, the service performed in the year ending December 31, 1920, shows in relation to the preceding years as follows:

CLASS I—RAILROADS OF THE UNITED STATES

	Total Tons One Mile	Passengers One Mile	Train Miles (Passenger)
1916	396,365,917,082	34,585,952,026	582,859,175
1917	430,319,014,635	39,476,858,549	582,556,148
1918	440,001,713,665	42,676,579,199	536,692,235
1919	395,679,051,729	46,358,303,740	546,180,657
1920	449,292,355,000	46,724,880,000	571,653,863
Increased service 1920 over 1919	53,613,303,271	366,576,260	25,473,206
Increased service 1920 over 1919	13.55 per cent	0.79 per cent	4.66 per cent

The tonnage handled in 1920 was the largest in the history of the railroads, being 9,000,000,000 ton-miles in excess of that handled in the year 1918, when owing to the nature of the business and the extraordinary measures taken, the greatest tonnage moved up to that time was transported.

The increased expenses for 1920 are roundly accounted for as follows:

Increase in basis of cost 1920 over 1919	$872,400,000	19.83 per cent
Increased service performed 1920 over 1919	496,600,000	11.29 per cent
Total	$1,369,000,000	31.12 per cent

In the year ended December 31, 1919, the director general had $454,984,953 net operating income applicable to compensation (estimated at $896,000,000).

Had the business of 1919 been done over again with the increases in rates of pay and prices of fuel and material in effect in 1920, his expenses would have been increased by	$872,400,000
And instead of having a net operating income of	454,984,000
there would have been a deficit of	$417,416,000
Which added to the compensation of	896,000,000
would have resulted in a total deficit of	$1,313,416,000

Instead of a deficit of $421,016,000 for the year 1919.

The roads in 1920 also largely accomplished the relocation of car equipment which had been widely scattered during federal control, especially during 1919. This was particularly so with respect to coal cars which had been sent unusual

distances from customary points to take care of emergencies incident to coal strikes. This resulted in an unusually large ratio of empty car mileage.

Upon the release of the roads on March 1, 1920, 21.9 per cent of home cars were upon home lines, compared with 45.2 per cent at December 31, 1920, and 67.0 per cent at March 1, 1921.

It might be asked why it was necessary to relocate the equipment, particularly in the face of declining traffic. While it was unfortunate in a way that the expense incident to the unusual empty car movement had to be incurred at this time, it was most desirable that the equipment be returned to the companies which had provided the number and character of cars required by the trade and those best meeting the operating conditions under which the traffic must be handled, and, further, it was important that the companies have an opportunity to review their equipment and arrange for necessary retirements and repairs.

In this connection I would call attention to the following as reflecting the situation respecting bad order cars:

	Total cars owned	Home cars on home lines	Per cent of cars owned on home lines	Total bad order cars	Per cent
At January 1, 1918..	2,264,019	1,118,856	49.4	128,780	5.7
At March 1, 1920...	2,328,460	507,887	21.9	153,727	6.7
At March 1, 1921...	2,345,638	1,570,485	67.0	243,586	10.7
At April 15, 1921....	2,346,269	1,683,884	71.8	289,771	12.7
An increase over January 1, 1918.....				160,991	

It will be noted that while the expense basis of 1920 over 1916 was increased 136.34 per cent, the revenue basis during the same period was increased only 51.68 per cent. As a result the ratio of operating expenses to operating revenues which in 1916 was actually 67.32 per cent becomes 107.31 per cent when revenues and expenses are restored to 1920 costs and revenue basis and instead of earning a net railway operating income of $447,541,000 as was done in 1916, there would be a deficit of $359,245,000.

Railway Operating Income Following Change in Rate Structure

Question has been raised concerning the failure on the part of the railroads to realize the anticipated net returns incident to the increases in rates and charges approved by the commission under its decision in what is known as Ex Parte 74, and whether the railroads in their presentation to the commission failed to correctly forecast the results. This situation, because of the varying conditions and the difference in the rate increases in the several territories, can best be considered by the groups or districts adopted by the Interstate Commerce Commission in Ex Parte 74, and as I am more familiar with the Eastern district, I will confine my remarks chiefly to the figures relating to that group.

The commission granted increases in rates and charges for the Eastern district as follows: 40 per cent in freight on traffic local to the district and 33⅓ per cent on inter-territorial traffic. It is estimated the effect of the inter-territorial rates and the necessary adjustments were given to the Eastern carriers an increase in freight rates on all freight traffic of approximately 34 per cent instead of 40 per cent, and based on the year 1919 would have afforded an additional revenue of about $618,749,085, as compared with $723,422,256, the amount that would have been received had the full effect of a 40 per cent advance been realized. The amount thus realized was approximately $105,000,000 less than originally contemplated. The total difference resulting from under-estimate in rates of pay and lesser revenue than that recommended by the carriers was about $146,673,000, which deducted from amount required for a 6 per cent return, $559,409,000, leaves estimated net income for the Eastern carriers of only $412,736,000, or a return of but 4.42 per cent.

There was a marked increase in traffic during 1920 up to and including October, followed by a sharp decline in November and December, the decline in fact being so rapid that it was not possible to adjust maintenance and operation methods so as to at once effect corresponding reductions in expenses. The increase in rates granted in Ex Parte 74 became effective in large part but not in whole in August, 1920, and the months of September and October of that year measurably reflect the effect of the higher rates in relation to the increased bases of costs . The net railway operating income of the carriers for these two months projected on the same basis for a twelve months' period would give an annual net railway operating income for the year as follows:

	September & October Net Railway Operating Income	Same Projected Over 12 Months' Period	Return on Valuation
Class I railroads of United States	$159,765,798	$778,388,507	4.12 p.c.

The returns for these two months, as projected through a 12 months' period, fell much below expectations. It is believed, however, that the full realization of the rate basis as actually authorized, together with such economies and reductions in operating costs as may be effected, will, with a normal business, yield results more closely approximating the intent of the act.

A careful review of the situation shows very clearly that the increases in rates of pay and prices of fuel, materials and miscellaneous items have been greatly in excess of the increase in the basis of charges for transportation and that the adjustments made with a view to correcting this situation have in part failed of their purpose because of the severe decline in traffic.

The situation, not only with respect to working conditions, but also as to rates of pay, is now before the Labor Board.

It is expected that substantial reduction will be secured in the price of fuel for 1921; in fact, a number of contracts have already been made effective as of April 1st much under last year's prices. Other material prices are showing a gradual decline, and as materials and supplies now in stock are consumed and gradually replaced with materials purchased at lower figures there will be reduced charges to expenses on this account—all of which will be reflected in lower operating costs. Meantime the railroad representatives in conference with the Interstate Commerce Commission are making such rate adjustments from time to time as are found necessary in order to remove inequalities and re-establish proper relationships.

Mr. Willard Challenges Lauck Statement

Mr. Willard also challenged the recent statement of W. Jett Lauck before the Railroad Labor Board as to how the railroads could save $1,000,000,000 annually in operating expenses.

Taking up the specific items cited by Mr. Lauck, Mr. Willard pointed out, for example, that it was asserted that $278,000,000 might be saved by modernizing locomotives. To realize the economies claimed to be possible in this direction would require capital expenditures on the Baltimore & Ohio alone of $165,000,000, Mr. Willard estimated. For the railroads of the entire country the capital outlay required would amount to some $4,000,000,000 on this basis.

With respect to the improvement of shops, Mr. Willard said that the problem on his own road had been presented in this way:

"Is it desirable to spend at this time for new shops $2,000,000, which sum is available and which expenditure would enable to repair its locomotives at a lesser cost, or should the money be used for the purchase of new steel coaches which will mean no economy in operation, but on the contrary mean an increased cost of transportation because of the greater weight of the steel equipment?

"It was decided that the public in this instance would be better served by spending the money available for steel coaches rather than for new shops, inasmuch as it was possible to maintain the motive power in the existing shops."

Mr. Willard stated that he raised no issue at all with the proposition that there are possibilities of still further savings on the part of the railroads. He questioned only the practicability of such savings as have been proposed by Mr. Lauck when considered from the point of view which confronts railway managements.

"The question is a very practical one," Mr. Willard said. "If a condition could be conceived of wherein the railroads had all the money that was necessary—first to provide safe and regular transportation as demanded by their patrons; second, to provide a constantly increasing carrying capacity to take care of the growing business of the country, and in addition thereto a sufficient sum to replace all facilities with modern and more efficient facilities wherever it was shown that by so doing economies could be effected—if such a condition could be conceived of, there would perhaps be no real excuse for the railway managers if they failed to adopt the policy of making the worst as good as the best, as suggested in Mr. Lauck's statement.

"The experience of the past shows that only a certain

amount of new capital in the aggregate is available in any one year for all investment purposes, and of the total amount so available the railroads require and obtain a portion. The capital requirements of other industries and undertakings must also be provided from the same investment fund, and the total amount available is provided presumably in such a way as best fits the demands and requirements of the immediate situation."

Mr. Willard also took up Mr. Lauck's charge that the railways have given no thought to engineering research for the purpose of promoting efficiency, filing with the committee a chart showing the organization of the American Railway Association, which he said had been maintained by the railroads for 38 years and which had large committees constantly engaged in investigating and reporting on the very things which Mr. Lauck said the railroads are not giving attention to. Mr. Willard went into detail regarding the matters being studied by these committees, showing the committee a large number of the reports and pointing out that the railroads have put into effect many improvements in methods resulting from these investigations as well as the investigations made by individual railroads. He described how the American Railway Association supervises the activities of numerous other organizations which were formerly separate associations and he also outlined the work of the advisory committee, of which he is chairman, which was created last year with particular reference to the new conditions created by the transportation act. Mr. Willard said he believed the transportation act does, in fact, make the future successful operation of the railroads possible under private ownership, but that it is necessary, of course, if they are to succeed that the large railways co-operate effectively and that they are trying to do through the several agencies and particularly through the advisory committee.

Mr. Willard also took up Mr. Lauck's charge that salaries of railway officers are exorbitant. Mr. Willard said that the profession of railway officer is about the only one in which it seems to be regarded as discreditable to succeed. Large salaries paid in the coal, steel and other businesses, he said, are very generally referred to in terms of commendation, even in the case of salaries as high as a million dollars a year, but whenever the salary of a railroad president is published in the newspapers it is done in terms which seem to suggest that he ought to apologize for it. Railroads in recent years have lost many of their best officers because of more attractive offers in other lines of business and whereas formerly railroads received large numbers of applications from bright young college men for opportunities to engage in the railroad service, they now receive very few. Mr. Willard said that he had felt that his own son ought to go into the railroad business, but before he finished his college course he had agreed with him that there were greater opportunities in other directions and that he ought not to go into a business in which to succeed is regarded as a matter of public reproach. He pointed out that if a railroad officer complies with the spirit of public opinion and of many laws he cannot make investments in any business that he knows anything about because as a railroad officer he is dealing with so many other businesses and that he is, therefore, largely limited to his salary.

Senator Wolcott said he had been told by a railroad trainman that the railroads were consuming a large part of their revenue in running private cars for the benefit of their officers and asked Mr. Willard to comment on that. Mr. Willard said that he would be glad to discuss the matter from the standpoint of his own experience because it was a subject of much misunderstanding. He said that he ordinarily spends one or two days a week in his office in Baltimore and a large part of the rest of the time traveling. His car is his office and he uses it for the business of the company. His secretary travels with him and a cook and a porter accompany the car. In order to save his time also the porter carries his baggage to and from his house and he personally pays half of the porter's salary. Before the war when he occasionally took a vacation he sometimes took the car and in that case personally paid for the supplies used. Ordinarily there was no charge for the handling of the car off his own line because railroads extend that courtesy to each other. Mr. Willard said that while he "might be considered an excrescence," certainly superintendents, general superintendents and other officers are necessary to the operation of the railroad and as their duties require them to be on the road most of the time it is a matter of real economy to have an office car. They are simply traveling officers and they are frequently required to stop at small places where hotel facilities are lacking.

Taking up another point made in an exhibit filed by Mr. Lauck, in which it was stated that 69 bad order cards had been removed from Baltimore & Ohio cars at Cumberland in order to keep them in service, Mr. Willard said he had made an investigation and found it was true, but that the cards were removed by the direction of the foreman, who had substituted his more experienced judgment for that of the inspector, as he had authority to do, because in his judgment the cars were safe to run. These cars have been running since February and nothing has arisen to indicate that the foreman's judgment was not correct. He also referred to a statement made in Mr. Lauck's exhibit that the cost of repairs to a certain number of cars in the Baltimore & Ohio shops was $514 and that the cost of similar work in outside shops where it was having work done was $1,015. Mr. Willard said that evidently these figures had been obtained from some subordinate clerk and he had had a check made of 10 cars mentioned and found that where Mr. Lauck's exhibit showed a labor charge of $229 the company's records showed a charge of $245, and where Mr. Lauck's exhibit showed $290 for materials, the company's records showed $380, making an actual cost in the company's shops of $625. He had also found, he said, that the cost of repairing these same cars in outside shops under the contracts in force would have been $680 instead of $1,015.

Referring to Mr. Lauck's exhibit relating to interlocking directors, Mr. Willard said he was personally interested because the Baltimore & Ohio was mentioned and one of its directors, L. F. Loree. He added that R. S. Lovett and Samuel Rea had formerly been directors, but are not at present. In reply to a question, he said there was absolutely no relation between the Baltimore & Ohio and the Pennsylvania except that of competitors. When such statements as that about the interlocking directorates are made, Mr. Willard said, it is for the purpose of creating the impression that because of the interlocking relationship the directors of other companies probably exercise some influence over the Baltimore & Ohio inimical to its best interests. The directors, he said, were capable of defending themselves from such insinuations, but he was personally interested because under the ordinary form of corporate organization the only way directors can influence contracts or purchases is through the chief executive officer. They do not make contracts or buy materials themselves, but they approve what is done by the executive officer. If the Baltimore & Ohio directors had at any time exerted an influence of the kind suggested over the Baltimore & Ohio, Mr. Willard said, "it was because I was their willing tool, and I was not. Never at any time or concerning any subject did any of these directors ever suggest or hint to me that he would desire me to do anything inimical to the interests of the Baltimore & Ohio. I am saying this in the interest of the executive officers. Even though some such improper influence may have been exerted by some one at some time, it is certainly unfair and unjust to accuse everybody of the same thing."

Mr. Willard also filed with the committee a statement for the year ending February 28, 1921, in which the railroads

had a net operating income of $2,090,000 as compared with $530,000,000 in the previous year. This year, he said, included six months under the increased rates and 10 months under the increased wages. If the rates had been in effect for the full year $507,000,000 would have been added to the freight revenues, $108,000,000 to the passenger revenues, $28,000,000 to other revenues, making a total of $643,000,000 and if the award of the labor board had been in effect for the full year the expenses would have been increased by $102,000,000 and on this basis the net operating income for the year would have been $543,000,000 or hardly more than half of the 6 per cent return.

Referring to his statement of the day before regarding poor railroading in 1920, Mr. Willard said that some of his friends had thought he had not given the railroads sufficient credit for what they did in 1920 in moving the largest freight and passenger traffic in history without increase in facilities. He said that the conditions which followed the return of the railroads to private operation which the railroads had to contend with were such that they did not get as good results as he thought they ought to have, but they did move the business by increasing the train load and the car load and increasing the average miles per car per day.

A. H. Smith Begins Testimony

Mr. Willard was followed by A. H. Smith, president of the New York Central, who before beginning his prepared statement regarding the results of operation on the New York Central, pointed out the difficulties being experienced by the railroads in collecting what is due them for the period of federal control. He said the railroads before the war were the best transportation machine in the world and furnished transportation more economically than those of any other country. They did their part in the war, and he thought that even today they constitute the best transportation machine in the world and furnish transportation more cheaply than those of other countries, although, he said, that may not be saying much in view of the conditions of the railroads in other countries at present, but he felt that the country had been unappreciative of what the railroads did during the war and that some means ought to be taken to expedite the settlements with the Railroad Administration. He referred particularly to the adjustment of materials and supplies accounts. He said, however, he did not know that the Senate committee was in a position to do anything about it. Senator Cummins said that the committee probably could not do anything, although he was sure it was sympathetic and would be very glad of any opportunity to do anything. He said that he had been very much disappointed in the delays experienced in settling the affairs of the Railroad Administration and that he supposed no member of the committee had ever assumed that the work would take so long. Mr. Smith said that his company had only filed part of its claim with the Railroad Administration, but that the whole subject was so complicated that it is very difficult to do so and the principles have not been laid down on which the railroads can file their claims.

"It seems to me as a citizen," he said, "that some means ought to be found to get us together. These are good railroads and I think as good soldiers they ought to receive liberal treatment from the government."

Senator Kellogg asked questions to bring out the fact that the railroads of England, France and Canada are in a condition very similar to that of the railroads here. Mr. Smith was to continue his prepared statement on May 19.

Mr. Kruttschnitt Questioned by Committee

Mr. Kruttschnitt had completed his direct statement on May 12 and was recalled for questioning by members of the committee on May 12, 13 and 16. In response to questions he made the following points:

1. That a reduction in operating expenses is the most vital and important point now.
2. That the proposal to reduce rates in order to stimulate traffic to a profitable point is a "purely speculative" proposal and the roads are in no financial position to undertake problematical experimentation.
3. That the present financial plight of the railroads grows directly out of policies and decisions during federal control in relation to rules and working conditions, wages and prices.
4. That the Transportation Act should be allowed to have a full and fair trial without being tinkered with.

Much of the questioning was devoted to a discussion of freight rates and the probable effect on traffic of an immediate reduction.

"I have some questions as to whether the present rates have not discouraged traffic," said Senator Townsend of Michigan.

"I do not think the rates constitute an overcharge on the part of the railroads," Mr. Kruttschnitt replied.

"Do you think that the increased rates have reduced or increased the revenues?" Senator Townsend asked.

"I do not think they have had any appreciable effect," was the reply. "The increase in rates was given at a time when business was beginning to decline and prices were falling."

Mr. Kruttschnitt said that he did not believe that if the business depression had not occurred that there would have been as much necessity for a reduction in wages.

Senator Myers of Montana asked if decisions made while the railroads were under federal control were not responsible for the present situation of the railroads. Mr. Kruttschnitt replied "Yes, particularly as to expenses."

Attention was called to the contentions that a reduction in rates would have a tendency towards stimulating traffic. Mr. Kruttschnitt declared that the stimulative effect on traffic of reducing rates is largely speculative.

"Are the roads in a condition financially to engage in an experiment of that kind?" asked Senator Myers.

"No," answered Mr. Kruttschnitt. "During the last few months many of the roads have not earned their fixed charges or operating expenses. I do not want to be understood as opposing a reduction in rates where necessary, but I think there ought to be some proof demanded that would show that such a reduction would leave the carriers at least no loss."

"The outlook is extremely bad. Some roads may be able to hang on for a few months but I am afraid some will lose their grip."

"I said first of all we must reduce expenses; we now are compelled to pay laborers from 40 to 46 cents an hour for an eight-hour day on our lines while contractors, farmers and others pay only $1.75 to $2.00 for a ten-hour day. We are not allowed to do anything until we can get permission from the government authorities to reduce wages."

"Wasn't government control responsible for this condition?" Senator Frelinghuysen of New Jersey asked, to which an affirmative response was given.

Alfred P. Thom, general counsel for the Association of Railway Executives, reminded the committee that the increase in freight rates "had the very strong endorsement of the shippers of the country" at the time it was made.

"The idea seems to be abroad that it would help the railroad situation much to let them go into the hands of receivers and then squeeze out the water in the stock," said Senator Wolcott of Delaware. "Are the railroads earning the interest on their bonds alone, regardless of stock?"

"No," replied Mr. Kruttschnitt. "Then," remarked Senator Wolcott, "it would not change the railroad situation now even though the stock was all water, would it?"

"It would not," was the reply.

The assertions made that the roads could reduce their operating expenses through further great economies, were characterized by Mr. Kruttschnitt as extravagant.

"I do not know how any more great economies could be

put into effect than are now being practiced," the witness said. "I would be very reluctant to say that we have got to the point where we can not do better. An executive who gets to that point is about ready to be retired. But I do say that we are at a point where contentions that fabulous sums can be saved through further economies are unfounded. If the railroads were allowed to employ unskilled labor at rates other people are paying they could save $600,000 a day."

Mr. Kruttschnitt said new economies were constantly being instituted but added that the results of those economies could not be as great in the next 10 or 15 years as they have been in the last 10 or 15 years. He said he knew of no waste of importance now being practiced in the management of the railroads.

Asked regarding his opinion of the Transportation Act, the witness said:

"I believe the Transportation Act is one of the best pieces of work Congress has ever done and I would dislike extremely to see it changed in any way until it had been given a full and fair trial. If I had an amendment in mind I would not offer it."

In response to a question by Senator Townsend the witness said he did not believe the action of Congress in directing the Interstate Commerce Commission to fix rates so as to yield, so far as might be, a return to railroads by groups of from 5½ to 6 per cent had resulted in any letup on the carriers' part in economy or caused them to be operated any less efficiently, as a railroad got no profit unless it earned it.

In compliance with a request made by Senator Kellogg, Mr. Kruttschnitt presented to the committee a table showing in complete detail what sums had been spent for railway operating expenses and taxes in each year from 1917 to 1920 inclusive. Senator Kellogg had requested especially that the exhibit show separately the sums expended in payment of salaries of general officers, division officers and for the wages of all other employees, and that this also be shown in the form of percentage expended for each item out of each dollar expended.

The tabulations showed a progressive increase for each year in the items for operating expenses, taxes, and for the total of the two. The following table gives the figures for the lowest point (1917) and the highest point (1920):

Item	1917	1920
Operating expenses	$2,829,325,124	$5,768,720,013
Taxes	213,920,095	278,868,668
Total operating expenses and taxes	3,043,245,219	6,047,588,681

The exhibit also shows that whereas in 1917, 55.27 cents out of every dollar expended for operation and taxes went for wages of employees (labor costs), it had increased in 1920 to 59.62 cents out of each dollar.

Salaries of general officers on the other hand decreased from 1.15 cents to .78 cents out of each dollar. The salaries of division officers remained practically stationary, being .74 cents out of each dollar expended in 1917 and .75 cent in 1920.

The table covering the salary and wage distribution of each dollar of money expended is as follows for 1917 and 1920:

Item	1917	1920
Compensation of employees:		
Salaries of general officers	1.15c	0.78c
Salaries of division officers	0.74c	0.75c
Wages of all other employees	55.27	59.62
Total compensation	57.16	61.15

The sum total of operating expenses and taxes rose from $3,043,000,000 in 1917 to $6,047,000,000 in 1920, of which the greatest increase was in labor cost, an increase in the four years of $1,866,273,374.

The total for salaries of general officers of the railroads of the United States in 1920 was $47,119,465, as against $3,605,755,516 for labor. The salaries of general officers represented two cents out of each dollar expended in 1917 and 1.27 cents in 1920.

Government Loss Estimated at $1,800,000,000

Senator Cummins, during his examination of the witness, expressed the opinion that the 26 months of federal control would cost the government approximately $1,800,000,000. His estimate, he explained, was based on correspondence which he had had with Director General Davis.

Director General Davis, in a statement recently submitted to a House committee, estimated that the loss to the government growing out of the 26 months of federal operation would be approximately $1,200,000,000, or $300,000,000 more than was estimated by Director General Hines. This estimate, Senator Cummins said, was based on the supposition that the maintenance claims would be adjusted as per the Railroad Administration's theory. "If the claims are settled on the theory advanced by the railroads as to maintenance, then it is estimated that the loss to the government for the 26 months will be not less than $2,500,000,000. If adjusted between those extremes, I think it is safe to say that the loss will be in the neighborhood of $1,800,000,000," he said.

Later on, calling attention to the financial condition of the railroads, the Senator intimated that unless some means were found of either increasing revenues or decreasing operating expenses, federal operation of the transportation systems of the country would result, and the government would have to stand the deficit.

"A good deal has been said in the newspapers recently about the failure of the Transportation Act," said Senator Cummins in opening his examination of Mr. Kruttschnitt. "The act did not fail to give to the railroads a larger revenue than they ever had before in the country's history, did it?"

"No," replied Mr. Kruttschnitt, "but as I have already expressed in my statement, the increase in rates were not received until very late in the year and were then only about eight per cent when applied to the whole year."

Mr. Kruttschnitt added that the revenues in 1920 were approximately $1,041,000,000 greater than in 1919, of which amount only about $418,000,000 was due to increased rates. He explained that the act in itself was not a failure but said that abnormal conditions in 1920 prevented the carriers from receiving what Congress expected when the bill was passed.

"Do you think it was the duty of the Interstate Commerce Commission to provide larger revenues than were provided?" Senator Cummins inquired.

"The act tells them what to do," Mr. Kruttschnitt answered. "If conditions then had warranted a higher award, I assume they would have made it."

As to the amount of increase in rates asked for by the carriers when the present increase was allowed, Mr. Kruttschnitt said their request was based on "the economic conditions of the times." He added that he believed the Transportation Act "did everything Congress could foresee" and that the law "marked a new era" in the transportation history of the country.

"Do you think the law has failed so far as the Labor Board is concerned?" Senator Cummins asked.

"I don't think the law has been given a fair chance to prove in all directions its merits or shortcomings," the witness answered.

Continuing, Mr. Kruttschnitt said he thought the "theory of the law" relative to the labor provisions was correct but he did not believe anybody thought it had been an exact success so far, asserting that he believed the Labor Board's proceedings had been too protracted and its decisions delayed too long.

Asserting that the labor difficulties had been inherited from federal control, Senator Cummins asked what would

have happened to the railroads if the law had not set up the board at the time of the labor troubles which followed relinquishment of federal control on March 1, 1920. Mr. Kruttschnitt replied that he believed a strike of railroad employees would have resulted.

"If it hadn't been for the law, this country would have been in a very disastrous strike," Senator Cummins asserted, to which the witness replied that the losses to the whole country "would have been almost incalculable."

Senator Cummins asked if it were not true that a very considerable part of the excessive expenses of 1920 was due to the unauthorized strike of switchmen. Mr. Kruttschnitt responded that the strike was very expensive to the railroads.

Asked by the Iowa senator if he thought the delay from April 1 to the following July in solving the problem of a wage increase for railroad employees was "undue delay on the part of the Labor Board in a matter of that magnitude," Mr. Kruttschnitt answered:

"No, because the board in that case offset the delay by making its decisions retroactive. The present delay of the board, however, is costing the roads from $500,000 to $600,000 a day because the board's decision cannot be made retroactive."

Senator Cummins asked why it was that after September 1, when the federal guaranty period expired, and when both carriers and employees were free to bring up the wage question, there was such long delay in beginning these proceedings.

"For the reason," Mr. Kruttschnitt replied, "that for several months after the rates were raised, business continued to increase and the roads to a certain extent were making the earnings contemplated by the Transportation Act and they were hoping to avoid this issue because they knew it would be a long, bitter contest. They were compelled, however, to make a protest because of the decline in traffic and earnings."

Calling attention to the fact that the hearing had just been completed before the Labor Board, Senator Cummins said it was his judgment that there has been "remarkable speed in the hearing of testimony and in the submission of the case" but said that the dispute over the abrogation of the National Agreements "engaged the board's attention for three or four months."

Mr. Kruttschnitt explained that the men who presented the railroads' case before the Labor Board were to be called later before the Senate committee to testify.

Attention was then turned to the financial conditions of the railroads. During this Senator Cummins said that if federal operation became necessary and no way could be found to increase revenues or decrease expenses, the deficit would have to be taken from the federal treasury.

Taking up the question of maintenance, Mr. Kruttschnitt called attention to the order issued by the Railroad Administration on December 16, 1920, by which the national agreement was made applicable to sectionment. This, he said, added very largely to the cost of maintenance because it established for the first time not only an eight-hour day for them but also punitive overtime.

As to the prospects for a reduction in the cost of maintenance as one of the means of reducing operating expenses, Mr. Kruttschnitt said cross ties in 1919 averaged $1.06 apiece while in 1920 the price was $1.31, but he said the railroads hoped to obtain a reduction this year. Cost of steel rails, he said, had already been fixed, so that no reduction in that direction is anticipated.

The cost of labor for maintenance of way constitutes about 60 per cent, according to Mr. Kruttschnitt, who said the carriers hope that will be reduced. Senator Cummins remarked "We have got to find some way to bring these costs down or you won't have any money for interest, bonds or other purposes."

In reply to a question by Senator Cummins, Mr. Kruttschnitt filed a statement showing that the results for 1920 were not materially affected by the statistics for Class II and Class III roads, because 451 of such roads had a combined deficit of $1,060,000.

Senator Cummins by his questions tried to bring out an estimate of what economies the railroads would be able to effect this year. He asked what would be the reduction in maintenance and transportation expenses if the wage reductions proposed by the railroads are carried out and how much the roads expect to save on materials in view of the reductions in prices of coal, steel, lumber and ties. Mr. Kruttschnitt was unable to give an answer offhand but agreed to file a statement later. He was also asked to give comparisons of the labor and materials which entered into the operating expense accounts for 1920, 1919 and 1917.

"The main object of this inquiry," said Senator Cummins, "is to find whether the railways are going to be able to maintain themselves or whether we have got to find some better system. It is quite plain that if you don't do better this year than you did last year, you won't last long."

"That is quite plain," replied Mr. Kruttschnitt.

Senator La Follette followed Mr. Kruttschnitt's testimony closely and demanded copies of his various charts and statements but declined to question the witness directly.

The hearing has attracted considerable interest and all the available seats in the committee room have been occupied by railroad officers, shippers, labor leaders, and others.

Frank P. Walsh and W. J. Lauck made their appearance at the hearing on Monday and Senator Cummins read a telegram stating they had been authorized to represent the Railway Employees Department of the American Federation of Labor as counsel, consulting economist and statistician.

Fruit and produce growers of the Pacific Coast have wired to Senator Hiram Johnson, of California, asking that he appear before the Senate committee investigating the railroad situation to appeal for some remedy for the "excessive" freight rates from the Pacific Coast. The communication from the California Vegetable Union said in part:

"In marketing our vegetable crops we meet with competition from other producing sections which have always had advantage in freight rates. The recent horizontal increases have so widened the differentials to the large eastern markets we now cannot overcome this competition. As long as our competitors' products are in the markets we can only sell at heavy loss. There was average loss of approximately $1.32 per crate on celery last season shipped from San Joaquin, Sacramento and delta regions and in consequence there will be reduction in acreage for coming season of about one-third unless some relief is had in present exorbitant freight rates. Heavy shipments of vegetables to date might be considered as indicating prosperous condition which, however, is not the case. Growers having brought their crops to maturity have shipped them because by so doing their losses were less than would have been had crops been plowed under. Although returns have not covered cost of production they did allow some margin of profit over harvesting expenses. The horizontal increases which failed to take into consideration matter of value always previously used in determining rates were incorrect in principle and fundamentally wrong."

THE CHICAGO, MILWAUKEE & ST. PAUL plans to supplement the quarters furnished by the forty-five or more hotels of Des Moines, Iowa, when the Shriners' Convention is held from June 14 to July 7, with sleeping cars, which will be parked in the yards. Shriners remaining in the cars will have more than the usual traveling conveniences as baggage cars are to be equipped with hot and cold showers and booths will be placed throughout the area where visitors will find clerks ready to provide the service desired.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING for the week ended May 7 showed a drop of nearly 4,000 cars as compared with the week before, according to the weekly report of the Car Service Division of the American Railway Association, after three weeks of increases. The total was 718,025, as compared with 843,184 in 1920 and 753,287 in 1919. The decrease as compared with the previous week is accounted for by a drop in the loading of anthracite coal, which caused a decrease in total cost loading from 145,010 cars to 143,323 cars.

There were decreases as compared with the corresponding week of 1920 in all classes of commodities and in all districts, but as compared with the week before there were increases in the Pocahontas, Northwestern and Southwestern districts.

The reports for the weeks of April 30 and May 7 follow:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, FOR WEEK ENDED SATURDAY, APRIL 30, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded: This year, 1921	Corresponding year, 1920	Corresponding year, 1919	Received from connections: This year, 1921	Corresponding year, 1920	Corresponding year, 1919
Eastern	1921	6,111	2,722	38,285	889	5,578	919	56,310	67,310	178,124			185,360		
	1920	4,806	2,665	48,745	2,090	7,977	3,260	31,698	82,409		183,650	185,122		182,321	201,890
Allegheny	1921	2,776	3,085	44,126	2,477	2,306	950	42,427	46,958	145,105			98,139		
	1920	2,355	2,697	51,492	6,674	3,192	5,399	34,887	60,403		167,099	155,838		107,149	118,772
Pocahontas	1921	118	86	19,095	54	1,355	25	2,634	5,838	29,205			13,339		
	1920	157	60	16,165	618	1,868	236	177	9,386		28,667	34,181		15,711	17,876
Southern	1921	3,102	2,021	19,953	485	14,724	724	38,077	33,239	112,325			61,709		
	1920	2,600	2,225	21,982	150	19,063	2,659	26,039	52,629		127,347	111,949		78,006	57,903
Northwestern	1921	8,579	8,255	3,723	445	14,296	3,870	27,690	29,952	96,810			40,486		
	1920	8,846	7,267	7,074	905	21,191	14,004	20,935	42,118		122,340	113,775		56,084	48,146
Central Western	1921	9,354	11,388	15,464	158	4,229	576	30,199	31,815	103,183			46,392		
	1920	7,324	12,593	17,532	391	6,094	2,680	21,610	43,369		111,593	99,196		60,182	68,184
Southwestern	1921	4,386	2,352	4,364	151	6,066	661	16,455	22,810	57,245			43,648		
	1920	3,434	2,878	5,728	114	7,054	576	15,895	24,585		60,264	52,301		45,752	41,579
Total all roads	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997			489,073		
	1920	29,522	30,385	168,718	10,942	66,439	28,814	151,241	314,899		800,960			545,205	
	1919	36,587	31,998	158,603		54,861	31,586		438,727			752,362			554,350
Increase compared	1920	4,904						62,551							
Decrease compared	1920		476	23,708	6,283	17,885	21,089		76,977	78,963			56,132		
Increase compared	1919				4,659			213,792							
Decrease compared	1919	2,161	2,089	13,593		6,307	23,861		200,805	30,365			65,277		

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

April 23	1921	32,715	29,602	138,576	4,595	46,711	5,691	211,627	235,010	704,527	717,772	715,042	486,040	426,958	521,991
April 16	1921	33,367	26,530	135,658	4,365	47,909	4,941	214,082	237,044	703,896	601,695	706,012	472,107	317,933	525,277
April 9	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,142	237,351	693,719	801,559	711,282	466,513	560,040	530,396
April 2	1921	33,354	23,584	109,284	4,862	46,911	5,508	211,244	231,895	666,642	858,827	688,567	459,161	669,872	518,098

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, MAY 7, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded: This year 1921	Corresponding year 1920	Corresponding year 1919	Received from connections: This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	6,016	2,657	37,009	885	5,509	2,364	57,091	65,554	177,085			190,735		
	1920	4,566	2,867	47,476	1,967	7,849	3,888	33,534	88,588		190,735	183,630		191,716	199,075
Allegheny	1921	2,853	2,964	43,636	2,430	2,207	1,411	41,852	46,355	143,708			99,283		
	1920	2,074	3,271	50,578	5,383	3,512	6,383	35,513	68,612		175,326	158,613		121,923	122,417
Pocahontas	1921	124	85	21,763	44	1,167	32	2,599	5,428	31,242			13,641		
	1920	139	69	19,235	698	2,009	261	174	10,289		32,874	33,481		18,234	18,330
Southern	1921	3,268	2,010	19,518	499	13,970	635	38,155	31,288	109,343			59,878		
	1920	2,751	2,533	23,530	109	19,446	2,696	25,773	52,928		129,766	114,091		79,564	61,484
Northwestern	1921	8,275	6,895	3,939	448	14,573	7,421	27,207	31,022	99,780			40,843		
	1920	8,376	8,773	7,270	872	18,386	30,243	20,712	43,196		137,828	116,344		59,639	49,256
Central Western	1921	9,790	10,181	13,689	166	4,188	529	30,150	30,853	99,546			47,296		
	1920	7,543	13,139	18,138	412	5,940	2,901	22,298	43,146		113,523	97,157		66,115	56,065
Southwestern	1921	4,521	2,331	3,769	154	6,481	649	16,481	22,935	57,321			42,729		
	1920	3,689	3,192	5,929	147	7,187	553	16,330	26,105		63,132	49,971		49,476	43,085
Total, all roads	1921	34,847	27,123	143,323	4,626	48,095	13,041	213,535	233,435	718,025			494,405		
	1920	29,144	33,844	172,156	9,588	64,329	46,925	154,334	332,864		843,184			586,667	
	1919	33,973	30,792	166,139		54,476	39,405		428,502			753,287			549,712
Increase compared	1920	5,703						59,201							
Decrease compared	1920		6,721	28,833	4,962	16,234	33,884		99,429	125,159			92,262		
Increase compared	1919	874			4,626			213,535							
Decrease compared	1919		3,669	22,816		6,381	26,364		195,067	35,262			55,307		

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. And merchandise and miscellaneous columns to get a fair comparison.

April 30	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997	800,960	752,362	489,073	545,205	554,350
April 23	1921	32,715	29,602	138,576	4,595	46,711	5,691	211,627	235,010	704,527	717,772	715,042	486,040	426,958	521,991
April 16	1921	33,367	26,530	135,658	4,365	47,909	4,941	214,082	237,044	703,896	601,695	706,012	472,107	317,933	525,277
April 9	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,142	237,351	693,719	801,559	711,282	466,513	560,040	530,396

The number of surplus cars showed a decrease for the fourth consecutive week during the week of May 8. The total was 471,922, or over 9,000 cars less than for the last week of April. Of the total 174,227 were box cars or nearly 4,000 less than the week before and 220,259 were coal cars, or nearly 9,000 less than the week before.

Protecting Decks and Floors With Asphalt Mastic

NO OTHER EQUIPMENT of a railroad undergoes rougher usage than its floating equipment, such as barges and steel car-floats. Derailments, unequal expansion and twisting, all form depressions in the steel decks which demand continual overhauling. Rust also is a permanent bugaboo. In order to counteract the necessity of continual overhauling, the Pennsylvania has recently covered ten of its newest steel floats with a flooring of Texaco asphalt mastic. This covering is usually applied to a thickness of from ¾ to 1 in., sticking firmly and expanding and contracting with the steel as the latter expands and contracts with the repeated changes in temperature. One instance of its use is on barge No. 68, belonging to the Pennsylvania. Freight cars ran off the tracks of this barge, cutting holes in the steel flooring and causing it to bulge. In order to repair the damage, the company had asphaltic mastic applied over the flooring, the holes covered thoroughly, and then the entire surface given a 1-in. mat of the mastic.

In doing this class of work the kettles for heating the

material, as well as the material itself, were installed on the dock adjoining the barge, while smaller installations were made on the transfer platform of the barge itself. The

Applying and Spreading the Mastic

heated mastic was then distributed by means of buckets to the section to be covered, where it was poured and spread out by the workmen to the desired thickness.

A Scale-Proof Boiler for Locomotive Cranes

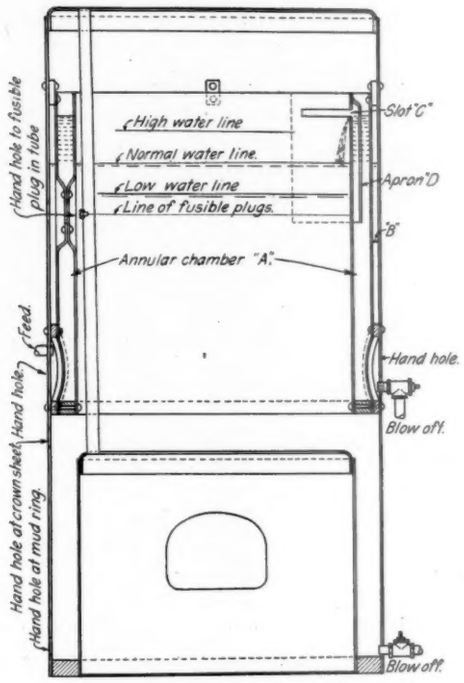
THE INDUSTRIAL WORKS, Bay City, Mich., has recently built a new patented locomotive crane boiler equipped with an annular scale chamber between the tubes and the shell plate. The design of this scale chamber in conjunction with the rest of the boiler design is such that the various impurities present in the feed water are precipitated and held where they can do no damage.

In this boiler the feed water is slowly passed through the scale chamber (at about 1/200 of the speed through the intake pipe) and attains a temperature at which the scale-forming impurities will be liberated from solution without the use of any chemicals. The impurities are then carried in suspension and as the movement of the water is slow these suspended precipitates settle down readily to the bottom of this chamber. This settling is accelerated by the decrease in its fluid friction.

The purifier consists of the annular scale chamber "A" extending completely around the tubes, with a one-inch water space "B" between this chamber and the boiler shell. The outlet into the main portion of the boiler is the slot "C", guarded by the apron "D." The feed water is admitted directly to the scale chamber "A" at a point farthest from the outlet slot. It then travels slowly around this chamber to the outlet, the apron "D" keeping any floating impurities from being discharged into the main boiler.

The sulphates of calcium are the hardest of the scale-forming impurities to get rid of. They are precipitated at 280 deg. F., corresponding to a boiler temperature when holding steam at only 35-lb. gage pressure. The carbonates and magnesia are precipitated at lower temperatures. These are all caught in the scale chamber together with mud, oil, and, in fact, all solids except common salt, for the first application of heat is what causes the liberation of these solids. The impurities left in the scale chamber do not bake into scale, as they do not come into contact with the hot furnace sheets, but are left as a soft mud which may be readily blown or washed out.

In a test of a 42-in. diameter boiler of this type, feed water naturally carrying 5 grains per gallon was loaded with 70 grains of calcium and 70 grains of earth, a total of 145 grains per gallon. The feed was taken from a barrel agitated with carbonic acid gas to form calcium carbonate. After about 1,200 gallons of this kind of water had been passed through the boiler it was allowed to cool. The heating surfaces and the lower mud ring were found to be per-



Vertical Section of the Boiler

fectly clean, with mud about six inches deep in the scale chamber. The blow-offs were both plugged so all impurities remained in the boiler. It was interesting to note that the presence of so much precipitated impurity in the scale chamber did not interfere to any appreciable extent with its operation.

Photo by Ewing Galloway

Railroad Station and Statue of Columbus in the Station Plaza at Genoa, Italy

General News Department

Walter H. Riddell has been appointed general superintendent of the Railway Mail Service, succeeding William I. Denning.

Repeal of the Transportation Tax on freight and express charges and passenger fares is proposed in a bill introduced in Congress on May 12 by Senator Trammell of Florida.

The Eastern Railroad Association, headquarters Washington, D. C., held its annual meeting in New York City on May 12, and re-elected A. W. Gibbs (Penn.), president, and E. N. Bessling, secretary.

Frank H. Alfred, president of the Pere Marquette, has issued an appeal to manufacturers and coal dealers, advising immediate purchase of fuel for the coming Winter. The road is already storing coal for next Winter's operation.

The Railroad Yardmasters of America, at their third annual convention, held at St. Louis, Mo., last week, discussed working conditions on railroads throughout the country. Changes in the constitution of the organization were proposed and additional details of the insurance plan of the order were worked out.

At Island Pond, Vermont, on May 13, the entire crew of a freight train of the Grand Trunk was arrested, together with another man, on charges of smuggling liquor into the United States from Canada. Customs officers are said to have surprised the gang, in a secluded spot, unloading liquor from the train into automobiles.

The American Electric Railway Association will hold its annual convention at Atlantic City, N. J., in the week beginning Monday, October 3, in the spacious and beautiful building which has just been completed on the boardwalk at North Carolina avenue immediately in front of Haddon Hall. The exhibits this year will be omitted.

F. M. Feiker, vice-president and chairman of the editorial board of the McGraw-Hill Company, publishers of Engineering News-Record and other technical publications, New York City, has been appointed personal assistant to Herbert Hoover, Secretary of Commerce, with the title of assistant to the secretary. Mr. Feiker was graduated from the Worcester Polytechnic Institute with the degree of electrical engineer. He has been in editorial work for fifteen years, and with the McGraw-Hill Company for the last six years.

The American Association of Engineers, at its annual convention at Buffalo on May 9, 10 and 11, elected officers as follows: H. O. Garman, chief engineer, Public Service Commission of Indiana, Indianapolis, Ind., president; A. N. Johnson, dean of engineering, Maryland State College, College Park, Md., first vice-president, and A. S. Morris, auditor of capital expenditures, Chicago & North Western Railway, second vice-president. W. R. McKeen, president of the McKeen Motor Car Company, of Omaha, Neb., was elected a director.

Senior Signal Engineers, Grade 1, salary $3,600, are called for by the last circular of the United States Civil Service Commission, which will receive applications for that position until June 7. A vacancy is to be filled in the Bureau of Safety, Interstate Commerce Commission; age limit, 25 to 55 years. The commission calls for graduates of a college or technical school who have had several years' practical experience. Employees of the Bureau of Safety are entitled to retirement annuities if they serve until the age of 70 and have been in the employ of the government 15 years. A deduction of 2½ per cent is made from the monthly salary to provide for the annuity.

Arthur Hale, formerly with the American Railway Association, has opened an office in the Union Trust Building, Washington, D. C., where he will act as agent and attorney for railroads. He is prepared to handle claims, valuation questions and generally to advise railroads in their relations with any branch of the federal government or with associations located in Washington. When Washington counsel is required, he proposes to engage Minor, Gatley & Rowland, who were attorneys in the private car case. Mr. Hale entered railway service in 1882 and was with the Pennsylvania 19 years. He was then on the Baltimore & Ohio for eight years and in 1909 was appointed general agent of the American Railway Association. Since his retirement from that position he has been vice-president of the Cumberland & Pennsylvania Railroad and the Consolidation Coal Company.

Operating Costs Reduced In February

A reduction in the cost of operation per train mile in February as compared with January is shown in the monthly bulletin issued by the Interstate Commerce Commission. The total of the selected accounts used by the commission to represent the cost per freight train mile was $2.112 as compared with $1.923 in February, 1920, and $2.166 in January. The total of the selected accounts for passenger train service was $1.142 as compared with $1.061 in February, 1920, and $1.164 in January. The cost of coal per ton was $4.61 as compared with $3.58 in February, 1920. The cost in January was also $4.61.

Careful Automobile Drivers

The Baltimore & Ohio began its campaign to enlighten automobile drivers in November, 1919, and the four million notices distributed since then, through the co-operation of state officers, and others, are believed actually to have reduced carelessness at crossings. About 100,000 observations have been made, and the percentage of automobile drivers who do not observe safety rules at crossings is smaller than it was in 1919. In January of this year, with 8,000 observations, the failures were five per cent; in February, 17,000 observations, failures four per cent; and in March, 23,000 observations, failures six per cent. Two years ago these percentages were about 25, and in 1920, 16 per cent. Non-observance of safety rule is, wherever possible, called to the direct attention of the driver; and the campaign is to be kept up with full vigor.

Money Talks

The Narragansett Pier Railroad, an eight-mile line in Rhode Island, which has been threatened with insolvency because of the competition of an electric line and automobile trucks, and from other causes, is to be kept running by the aid of contributions from two towns on its line. The president of the road having explained the situation, and the dependence of the towns on the road for the movement of coarse freight being clearly realized, town meetings unanimously voted specific appropriations. The town of Narragansett appropriated $5,000 and South Kingstown $10,000. By agreement with the road each town appoints a citizen to sit with the board of directors of the company. It is understood that the company agrees to continue operation at least until March 28, 1922, and to declare no dividends prior to that date. The road has three locomotives, and its line connects with the New York, New Haven & Hartford at Kingston (township of South Kingstown).

Operating Statistics of Large Steam Roads—Selected Items for the Month of February, 1921,

FREIGHT SERVICE

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Empty (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross. Excluding locomotive and tender	Ton-miles (thousands): Net. Revenue and non-revenue	Locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:													
Boston & Albany.....1921	394	240,140	258,441	30,152	3,844	2,446	61.1	219,481	89,683	127	30	19.1	...
1920	394	222,082	237,370	27,230	3,140	1,078	74.4	161,535	74,175	129	32	19.9	...
Boston & Maine.....1921	2,481	494,830	548,666	50,873	9,273	4,347	68.1	518,462	228,511	338	117	25.7	56
1920	2,482	512,883	557,824	49,215	7,466	2,374	75.9	392,926	180,776	322	121	27.3	3
N. Y., N. H. & H.....1921	1,959	394,484	426,026	34,136	8,370	4,154	66.8	452,595	200,711	299	65	17.9	31
1920	1,938	355,352	367,527	30,858	6,031	1,376	81.4	288,339	134,308	273	100	26.8	1
Great Lakes Region:													
Delaware & Hudson.....1921	880	378,159	525,679	34,148	8,363	6,357	56.8	601,043	292,723	280	35	11.1	50
1920	858	341,257	458,282	30,221	6,990	3,092	69.3	462,162	248,889	279	36	11.4	27
Del., Lack. & Western.....1921	997	448,220	553,326	113,241	12,017	6,406	65.2	693,223	321,373	319	58	15.4	35
1920	997	471,749	610,819	142,500	13,029	4,879	72.8	723,899	363,296	286	67	19.0	4
Erie (inc. Chic. & Erie)...1921	2,259	854,150	976,717	48,517	23,733	16,827	58.5	1,575,534	713,463	570	128	18.3	1
1920	2,259	1,019,837	1,157,582	37,345	27,865	19,102	73.4	1,626,984	825,856	509	189	27.1	8
Lehigh Valley 1921	1,431	504,204	564,407	52,362	12,822	7,657	62.6	812,591	390,497	406	133	24.7	93
1920	1,429	562,995	635,477	65,347	14,337	5,643	71.8	836,085	419,880	375	150	28.6	46
Michigan Central 1921	1,829	422,784	443,134	16,613	10,991	7,957	58.0	653,560	265,231	344	75	17.9	112
1920	1,826	535,843	574,822	18,793	17,082	4,342	79.7	861,526	414,700	333	76	18.6	...
New York Central.....1921	5,646	1,679,905	1,850,209	130,096	48,583	38,280	55.9	3,087,178	1,300,829	1,043	516	33.1	171
1920	5,646	1,938,177	2,201,504	164,115	58,498	22,451	72.3	3,272,136	1,625,886	(1)	(1)	(1)	(1)
N. Y., Chic. & St. L.....1921	572	312,491	314,311	181	8,243	4,832	63.0	454,291	183,641	109	61	35.9	29
1920	572	357,174	369,087	1,297	10,221	2,272	81.8	504,817	244,290	110	66	37.5	9
Pere Marquette 1921	2,207	234,952	240,086	4,091	5,299	3,204	62.3	278,807	131,961	172	34	16.7	34
1920	2,200	294,593	311,359	6,201	6,964	1,885	78.7	358,534	182,225	157	51	24.5	...
Pitts. & Lake Erie.....1921	225	101,452	114,382	1,128	2,907	2,093	58.1	216,515	118,686	67	14	17.3	13
1920	225	143,946	150,459	7,387	4,551	2,708	62.7	331,989	188,953	65	16	19.8	...
Wabash 1921	2,418	471,060	500,007	3,970	12,672	5,911	68.2	692,284	301,907	270	65	19.4	34
1920	2,418	573,631	590,877	7,992	15,083	3,517	81.1	769,313	383,445	256	85	24.9	...
Ohio-Indiana-Allegheny region:													
Baltimore & Ohio.....1921	5,185	1,524,400	1,910,327	102,728	32,702	26,237	55.5	2,235,122	1,026,686	1,058	303	22.3	198
1920	5,154	1,839,917	2,303,858	143,004	49,941	19,226	71.4	2,893,142	1,500,613	1,040	299	22.3	23
Central of N. J.....1921	678	247,323	270,085	28,611	4,945	3,773	56.7	351,384	175,293	202	62	23.5	14
1920	679	295,795	326,514	37,054	5,003	2,946	62.9	322,261	171,598	208	51	19.7	...
Chicago & Eastern Ill.....1921	1,131	207,296	208,749	4,431	4,585	3,311	58.1	293,990	143,531	107	66	38.2	11
1920	1,131	292,346	299,264	4,914	7,170	3,553	66.9	434,069	225,183	100	74	42.5	2
C., C., C. & St. L.....1921	2,396	587,750	618,701	2,188	13,779	11,585	54.3	933,291	377,906	315	117	27.1	47
1920	2,393	724,123	754,544	133	20,159	8,141	71.2	1,171,640	584,428	299	102	25.4	...
Elgin, Joliet & Eastern....1921	837	112,555	122,895	7,698	3,063	1,621	65.4	238,965	131,106	102	9	8.1	10
1920	832	161,308	185,191	12,371	4,464	2,789	61.5	326,573	177,232	94	14	13.0	..
Long Island 1921	395	36,584	41,470	7,343	425	235	64.4	22,555	8,987	34	7	16.6	3
1920	395	32,209	57,790	11,203	349	143	70.9	17,638	7,711	36	12	25.4	...
Pennsylvania System 1921	10,850	3,756,711	4,131,334	311,914	83,257	58,799	58.6	5,899,951	2,908,402	2,313	839	26.6	592
1920	10,927	4,331,454	4,814,348	367,290	103,656	47,154	68.7	6,521,778	3,443,996	2,025	1,036	33.8	30
Phila. & Reading.....1921	694	489,631	560,276	74,107	11,099	7,689	59.1	790,879	415,046	347	89	20.4	87
1920	690	608,045	696,159	84,415	13,149	5,967	68.8	867,524	492,032	297	83	21.8	4
Pocahontas region:													
Chesapeake & Ohio.....1921	2,543	587,141	640,327	19,226	15,072	12,650	54.4	1,147,897	585,329	406	155	27.7	84
1920	2,517	784,349	881,441	27,417	22,272	13,548	62.2	1,579,681	862,805	410	129	24.0	12
Norfolk & Western.....1921	2,210	571,828	696,520	24,271	14,329	10,296	58.2	1,089,423	571,135	478	203	29.8	141
1920	2,192	736,203	925,930	47,341	20,827	10,869	65.7	1,496,081	828,332	401	277	40.9	6
Southern region:													
Atlantic Coast Line.....1921	4,889	625,191	630,409	11,231	13,436	8,476	61.3	720,670	272,832	282	133	32.1	2
1920	4,893	699,621	702,384	12,421	14,797	6,558	69.3	752,976	305,017	276	128	31.7	...
Central of Georgia.....1921	1,908	210,896	212,570	2,185	4,166	1,766	70.2	230,511	110,036	102	24	19.0	...
1920	1,913	222,881	224,676	4,089	4,512	1,316	77.4	226,460	110,717	96	25	20.7	...
I. C. (inc. Y. & M. V.)...1921	6,151	1,508,839	1,517,942	31,813	34,625	20,730	62.6	2,261,312	1,048,935	732	110	13.1	13
1920	6,152	1,730,378	1,740,326	39,256	45,423	18,073	71.5	2,680,672	1,308,875	715	117	14.1	18
Louisville & Nashville.....1921	5,026	1,331,202	1,422,891	46,681	20,948	14,265	59.5	1,359,816	636,202	545	105	16.2	4
1920	5,024	1,479,417	1,617,335	54,399	26,135	12,589	67.5	1,586,088	795,601	514	120	18.9	...
Seaboard Air Line.....1921	3,537	422,350	428,723	8,969	8,444	5,501	60.6	476,858	178,718	174	78	30.9	...
1920	3,537	434,596	448,269	10,076	10,164	3,950	72.0	535,925	234,548	182	93	33.8	...
Southern Ry. 1921	6,944	1,129,047	1,150,060	24,109	22,529	10,885	67.4	1,215,793	523,116	884	240	21.4	70
1920	6,944	1,356,156	1,393,656	48,815	32,190	8,993	78.2	1,586,771	748,967	967	169	14.9	6
Northwestern region:													
C. & N. W.. 1921	8,320	1,394,473	1,434,977	18,093	24,765	16,822	59.5	1,492,786	675,825	639	319	33.3	2
1920	8,062	1,614,675	1,645,607	21,587	35,084	13,778	71.8	1,899,012	837,452	687	225	24.7	2
C., M. & St. P.....1921	10,604	1,191,867	1,232,855	61,470	26,000	16,540	61.1	1,481,664	640,780	677	360	34.7	70
1920	10,623	1,696,845	1,752,524	77,536	43,268	14,223	75.3	2,238,861	1,101,573	705	294	29.4	2
C., St. P., M. & O.....1921	1,726	294,543	313,226	13,154	4,882	2,675	64.6	273,580	111,630	152	52	25.5	27
1920	1,726	357,778	383,250	17,744	6,659	2,349	73.9	349,209	164,096	157	56	26.3	15
Great Northern 1921	7,980	618,104	636,792	23,085	14,790	5,951	71.3	824,007	401,690	589	180	23.4	245
1920	7,986	1,021,156	1,064,841	51,511	26,370	8,720	75.1	1,364,275	681,966	499	231	31.6	16
M., St. P. & S. Ste. M...1921	4,225	423,190	429,672	6,552	8,379	3,938	68.0	441,263	212,940	341	66	16.2	51
1920	4,227	581,757	491,308	9,060	13,046	3,143	80.6	599,106	306,715	329	75	18.5	38
Northern Pacific 1921	6,408	588,202	616,966	41,955	15,495	6,502	70.4	872,781	423,627	547	158	22.4	168
1920	6,389	1,024,121	1,089,652	81,510	29,610	9,671	75.4	1,609,966	821,254	508	163	24.3	14
Ore.-Wash. R. R. & Nav..1921	2,196	167,305	185,344	23,319	4,014	1,375	74.5	220,232	110,073	121	41	25.3	4
1920	2,186	262,997	305,603	46,829	7,112	1,943	78.5	388,545	205,236	126	37	22.7	...
Central Western Region:													
Atch., Top. & Santa Fe....1921	9,771	1,356,358	1,415,535	64,772	30,311	22,678	57.2	1,876,664	700,514	682	250	26.8	62
1920	9,455	1,751,033	1,840,793	78,133	46,144	19,114	70.7	2,463,528	1,060,126	673	259	27.8	9
Chicago & Alton.....1921	1,010	295,609	300,876	5,245	5,492	4,557	54.7	359,947	151,799	101	47	31.8	7
1920	1,010	348,337	359,362	5,458	6,957	3,738	65.0	418,795	192,969	119	49	29.2	2
Chi., Burl. & Quincy.....1921	9,322	1,368,698	1,429,314	64,969	32,580	20,699	61.1	2,025,479	956,564	680	268	28.3	69
1920	9,305	1,708,237	1,793,231	87,956	46,624	17,793	72.4	2,619,036	1,329,995	666	245	26.9	1
Chi., Rock Isl. & Pacific...1921	7,662	1,128,248	1,148,314	8,968	22,481	11,590	66.0	1,225,402	521,284	581	179	23.6	41
1920	7,596	1,383,182	1,411,577	11,734	30,259	10,076	75.0	1,566,571	736,198	474	224	32.1	6
Denver & Rio Grande.....1921	2,585	183,228	227,361	43,785	3,725	1,825	67.1	222,651	110,601	227	79	25.8	43
1920	2,585	270,558	338,631	66,041	5,324	2,966	64.2	335,446	170,285	215	100	31.7	1
Oregon Short Line.....1921	2,359	251,590	262,836	19,616	5,462	2,920	65.2	333,239	159,598	177	49	21.7	32
1920	2,348	439,551	458,704	45,896	11,050	3,040	73.7	639,313	333,485	172	60	25.9	14
Southern Pacific 1921	6,975	901,544	1,038,145	190,050	22,922	13,036	63.7	1,364,684	573,776	554	184	24.9	35
1920	6,948	1,108,471	1,280,339	229,037	30,435	12,739	70.5	1,698,737	777,416	562	166	22.8	2
Union Pacific 1921	3,614	648,582	662,164	40,547	17,907	9,297	65.8	1,607,572	438,390	399	154	27.8	74
1920	3,614	1,063,027	1,076,017	41,690	29,956	7,433	80.1	1,516,793	746,307	352	166	32.0	6
Southwestern region:													
Gal., Harrish'g & S. An...1921	1,367	292,395	292,922	909	5,740	4,420	56.5	385,427	163,919	74	39	34.5	...
1920	1,369	261,924	262,534	962	5,998	2,451	71.0	343,511	160,909	77	45	36.9	...
Gulf, Colo. & Santa Fe....1921	1,903	246,078	251,433	5,671	5,494	3,595	60.4	330,099	143,679	101	37	26.8	...
1920	1,933	229,706	231,786	4,824	5,144	1,908	72.9	267,974	122,807	100	34	25.4	4
Missouri, Kans. & Tex....1921	1,710	208,153	208,240	7,962	5,039	3,590	58.4	296,709	118,290	127	51	28.7	38
1920	1,710	274,859	275,332	3,646	6,519	4,566	58.8	383,908	155,999	96	28	22.6	...
Mo., Kans. & Tex. of Tex.....1921	1,740	238,497	242,762	2,900	4,292	3,171	57.5	269,076	110,504	110	41	27.2	17
1920	1,796	256,526	263,394	11,425	4,367	2,612	62.6	250,270	104,451	121	44	26.7	2
Missouri Pacific 1921	7,261	963,704	970,897	33,753	20,660	10,586	66.1	1,185,447	531,523	361	174	32.5	...
1920	7,261	1,128,801	1,136,061	35,472	27,275	8,289	76.7	1,461,973	727,736	(1)	(1)	(1)	(1)
St. Louis-San Francisco.....1921	4,761	719,784	728,275	11,563	11,639	7,196	61.8	684,489	284,426	342	143	29.5	28
1920	4,761	871,345	884,945	16,672	16,260	6,255	72.2	873,870	409,110	379	111	22.7	6
Texas & Pacific.....1921	1,947	291,380	291,423	2,914	5,832	3,854	60.2	346,480	135,212	117	73	38.4	4
1920	1,947	304,344	304,783	5,756	6,068	2,185	73.5	319,579	139,882	120	75	38.5	...

[1] Data not available.

Compared with February, 1920, for Roads with Annual Operating Revenues above $25,000,000

Region, road and year	Freight Service: Cars on daily line: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per car	Net ton miles per car-day	Car-miles per car-day	Net ton miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles	Passenger service: Train-miles	Passenger train car-miles
New England region:														
Boston & Albany....1921	3,178	4,681	7,859	6.4	1,350	914	374	23.3	408	28.6	8,131	233	285,359	1,765,969
1920	503	9,311	9,814	4.1	.....	727	334	23.6	261	14.8	6,493	308	286,245	1,739,906
Boston & Maine....1921	15,626	15,160	30,786	15.2	2,244	1,048	462	24.6	265	15.8	3,289	182	779,707	4,067,156
1920	7,371	31,428	38,799	8.3	.....	766	353	24.2	161	8.7	2,512	...	775,564	3,947,412
N. Y., N. H. & H....1921	22,983	17,689	40,672	14.4	4,981	1,148	509	24.0	176	11.0	3,660	220	979,198	5,877,262
1920	7,772	41,406	49,178	5.5	.....	811	378	22.3	94	5.2	2,389	294	925,101	5,409,243
Great Lakes region:														
Delaware & Hudson....1921	9,784	7,868	17,652	8.2	321	1,589	774	35.0	592	29.8	11,874	218	168,117	848,607
1920	2,159	14,982	17,141	5.9	.....	1,354	729	35.6	501	20.3	9,998	245	175,330	801,166
Del., Lack. & Western...1921	15,909	7,255	23,164	8.7	3,511	1,547	717	26.7	496	28.4	11,515	207	440,794	3,106,290
1920	3,669	21,970	25,639	5.4	.....	1,535	770	27.9	489	24.1	12,568	...	426,986	2,999,173
Erie (inc. Chic. & Erie)..1921	31,475	20,618	52,093	12.7	9,370	1,845	835	30.1	489	27.8	11,281	177	604,461	458,459
1920	6,569	50,741	57,310	6.7	.....	1,595	810	29.6	497	22.8	12,608	195	653,695	455,906
Lehigh Valley 1921	27,452	11,365	38,817	9.6	2,686	1,612	775	30.5	359	18.8	9,748	196	330,968	2,456,578
1920	8,515	32,449	40,964	5.8	.....	1,485	746	29.3	353	16.8	10,130	248	350,163	2,464,875
Michigan Central 1921	16,730	12,495	29,225	11.2	1,464	1,546	627	24.1	324	23.2	5,178	155	518,334	4,458,309
1920	3,414	36,331	39,745	6.8	.....	1,608	774	24.3	360	18.6	7,833	...	583,285	4,811,359
New York Central.....1921	78,864	60,757	139,621	9.6	21,854	1,838	774	26.8	333	22.2	8,228	150	2,156,578	16,157,346
1920	20,293	137,677	157,970	7.1	.....	1,688	839	27.8	355	17.7	9,930	...	2,208,179	15,827,200
N. Y., Chic. & St. L....1921	5,141	4,675	9,816	14.8	799	1,454	588	22.3	668	47.6	11,469	134	79,365	454,787
1920	1,308	10,580	11,888	6.2	.....	1,413	684	23.9	709	36.2	14,716	...	64,980	408,645
Pere Marquette 1921	9,700	7,135	16,835	9.5	2,000	1,187	562	24.9	280	18.0	2,135	189	259,700	1,219,586
1920	3,859	19,089	22,948	6.9	.....	1,217	619	26.2	274	13.3	2,856	210	256,881	1,232,276
Pitts. & Lake Erie.....1921	13,664	10,951	24,615	11.6	3,612	2,134	1,170	40.8	172	7.3	18,870	90	104,932	520,152
1920	3,636	21,791	25,427	9.1	.....	2,306	1,313	41.5	256	9.8	29,015	90	98,784	484,136
Wabash 1921	12,307	10,310	22,617	10.8	.....	1,470	641	23.8	477	29.3	4,460	196	490,733	2,469,594
1920	4,812	18,714	23,526	10.6	.....	1,341	668	25.4	562	27.3	5,469	212	493,348	2,464,221
Ohio-Indiana-Allegheny region:														
Baltimore & Ohio.....1921	64,993	38,059	103,052	7.2	5,718	1,466	674	31.4	356	20.4	7,072	221	1,246,118	7,810,727
1920	16,634	79,871	96,505	5.8	.....	1,572	816	31.3	536	24.0	10,041	...	1,238,739	7,523,675
Central of N. J.....1921	16,542	10,456	26,998	19.9	2,914	1,421	709	35.4	232	11.5	9,228	192	290,412	1,239,218
1920	3,928	19,412	23,340	7.7	.....	1,089	580	34.3	254	11.7	8,718	...	288,792	1,226,558
Chicago & Eastern Ill....1921	15,905	3,240	19,145	11.2	.....	1,418	692	31.3	268	14.7	4,532	207	218,359	1,384,118
1920	8,374	11,769	20,143	9.1	.....	1,485	770	31.4	399	19.0	6,863	...	218,734	1,410,465
C., C., C. & St. L.....1921	17,717	18,095	35,812	11.1	7,005	1,588	643	27.4	377	25.3	5,632	159	689,276	4,166,020
1920	2,310	30,162	32,472	6.5	.....	1,618	807	29.0	621	30.1	8,421	...	681,681	4,161,982
Elgin, Joliet & Eastern...1921	10,271	5,113	15,384	6.1	1,627	2,123	1,165	42.8	304	10.9	5,597	166	(2)	(2)
1920	8,140	10,340	18,480	5.2	.....	2,025	1,099	39.7	331	13.5	7,346	...	(2)	(2)
Long Island 1921	1,565	3,595	5,160	4.7	257	617	246	21.1	62	4.6	813	419	171,661	894,055
1920	561	5,892	6,453	3.4	.....	548	239	22.1	41	2.6	674	...	165,420	788,767
Pennsylvania System....1921	191,728	81,308	273,036	4.9	73,110	1,571	774	34.9	380	18.6	9,573	171	4,644,989	30,263,118
1920	85,567	202,443	288,010	7.6	13	1,506	795	33.2	412	18.1	10,868	...	4,920,162	31,470,065
Phila. & Reading.....1921	24,669	15,115	39,784	8.9	2,889	1,615	848	37.4	373	16.9	21,353	223	476,339	2,107,087
1920	5,261	30,622	35,883	5.4	.....	1,427	809	37.4	473	18.4	24,588	...	481,527	2,049,619
Pocahontas region:														
Chesapeake & Ohio.....1921	34,239	15,177	49,416	6.5	17,700	1,955	997	38.8	423	20.0	8,222	163	402,436	2,205,304
1920	4,878	30,306	35,184	8.6	.....	2,014	1,100	38.7	846	35.1	11,821	...	380,281	2,064,780
Norfolk & Western.....1921	35,239	9,947	45,186	6.7	10,794	1,905	999	39.9	451	19.5	9,230	198	353,454	2,184,433
1920	8,139	24,458	32,597	7.3	.....	2,032	1,125	39.8	876	33.5	13,031	...	372,383	2,301,815
Southern region:														
Atlantic Coast Line.....1921	21,927	12,683	34,610	11.1	.....	1,152	436	20.4	281	22.6	1,993	148	792,966	5,550,992
1920	6,120	29,093	35,213	9.0	.....	1,076	436	20.6	299	20.9	2,150	185	817,192	5,578,530
Central of Georgia.....1921	4,538	4,070	8,608	16.5	.....	1,093	522	26.4	457	24.6	2,060	180	291,509	1,486,114
1920	1,385	8,789	10,174	2.6	.....	1,016	497	24.5	375	19.8	1,996	...	306,136	1,540,952
I. C. (inc. Y. & M. V)..1921	42,623	20,641	63,264	5.9	10,569	1,499	695	30.3	592	31.2	6,090	163	1,307,844	7,450,308
1920	10,978	44,793	55,771	5.8	.....	1,549	756	28.8	809	39.3	7,337	...	1,315,806	7,621,463
Louisville & Nashville...1921	36,219	18,683	54,902	17.3	112	1,022	478	30.4	414	22.9	4,520	206	885,260	4,928,660
1920	13,655	29,947	43,602	7.2	126	1,072	538	30.4	629	30.6	5,461	...	844,756	4,999,505
Seaboard Air Line.....1921	10,662	10,338	21,000	15.0	.....	1,129	423	21.2	304	23.7	1,804	194	567,905	3,478,662
1920	3,157	21,467	24,624	6.5	.....	1,233	540	23.1	329	19.8	2,368	203	563,213	3,415,422
Southern Ry.....1921	35,893	26,368	62,261	7.8	12,117	1,077	463	23.2	300	19.2	2,690	226	1,269,622	7,765,536
1920	14,551	53,360	67,911	2.5	.....	1,170	552	23.3	380	20.9	3,719	...	1,366,684	8,248,493
Northwestern region:														
C. & N. W.....1921	45,683	25,262	70,945	6.8	3,600	1,071	485	27.3	340	20.9	2,901	209	1,538,657	8,990,398
1920	22,080	63,132	85,212	6.5	.....	1,176	519	23.9	339	19.8	3,582	...	1,534,973	8,979,882
C., M. & St. P.....1921	41,883	20,164	62,047	8.9	4,869	1,243	538	25.0	369	24.5	2,158	194	1,322,587	7,975,226
1920	19,660	71,798	91,458	5.8	.....	1,319	649	26.0	415	21.7	3,576	...	1,293,985	8,084,569
C. St. P., M. & O.....1921	3,300	11,154	14,454	11.3	1,414	929	379	22.9	276	18.7	2,309	205	291,309	1,626,784
1920	(3)	(3)	13,835	7.5	.....	976	459	24.6	409	22.5	3,278	...	298,340	1,727,565
Great Northern 1921	45,353	11,968	57,321	11.8	.....	1,333	650	27.2	250	12.9	1,798	201	903,896	5,356,085
1920	18,269	29,463	47,732	7.7	.....	1,336	668	25.9	493	25.3	2,945	...	889,155	5,392,015
M., St. P. & S. Ste. M..1921	15,923	9,473	25,396	11.1	1,697	1,043	503	25.4	297	17.5	1,799	153	397,147	2,042,417
1920	5,883	14,768	20,651	7.0	.....	1,030	525	23.5	512	27.0	2,502	166	362,540	1,935,875
Northern Pacific 1921	34,760	12,213	46,973	10.4	12,554	1,484	720	27.3	322	16.7	2,361	160	765,757	4,676,736
1920	13,218	25,500	38,718	6.9	.....	1,572	802	27.7	731	35.0	4,432	154	750,351	4,917,348
Ore.-Wash. R. R. & Nav..1921	3,769	4,373	8,142	9.9	2,473	1,316	658	27.4	483	23.6	1,701	233	234,906	1,548,240
1920	3,157	8,970	12,127	2.0	.....	1,477	780	28.9	584	25.7	3,237	...	227,047	1,437,837
Central Western region:														
Atch., Top. & Santa Fe..1921	47,330	16,062	63,392	9.0	10,820	1,384	516	23.1	395	29.9	2,561	159	1,716,638	12,449,369
1920	18,908	54,486	73,394	6.2	.....	1,407	605	23.0	498	30.7	3,866	166	1,761,436	13,318,930
Chicago & Alton.....1921	8,388	6,316	14,704	4.4	92	1,218	514	27.6	368	24.4	5,366	221	267,802	1,498,508
1920	2,078	11,888	13,966	2.6	.....	1,202	554	27.7	476	26.4	6,587	241	239,256	1,320,827
Chi., Burl. & Quincy....1921	44,891	22,699	67,590	9.4	.....	1,480	699	29.4	505	28.2	3,665	180	1,386,527	8,828,555
1920	17,854	57,083	74,937	5.5	.....	1,533	779	28.5	612	29.6	4,929	199	1,315,722	8,561,730
Chi., Rock Isl. & Pacific..1921	29,913	18,236	48,149	9.8	10,064	1,086	462	23.2	387	25.3	2,430	198	1,227,154	6,945,224
1920	16,251	38,366	54,617	5.9	.....	1,133	532	24.3	465	25.5	3,342	...	1,224,926	7,037,094
Denver & Rio Grande...1921	12,072	3,467	15,539	6.9	2,195	1,215	604	29.7	254	12.8	1,528	257	204,646	1,320,664
1920	8,008	7,320	15,328	4.2	.....	1,240	629	32.0	383	18.6	2,271	...	207,002	1,378,478
Oregon Short Line.....1921	7,871	4,688	12,559	6.2	2,965	1,325	634	29.2	454	23.8	2,416	171	269,550	1,881,139
1920	3,725	7,847	11,572	3.6	562	1,454	759	30.2	994	44.7	4,898	154	247,760	1,822,231
Southern Pacific 1921	18,650	20,454	39,104	8.0	2,482	1,514	636	25.0	524	32.7	2,938	167	1,354,611	10,169,058
1920	12,087	33,698	45,785	4.1	2,907	1,533	701	25.5	586	32.4	3,858	165	1,303,688	10,284,574
Union Pacific 1921	17,912	9,666	27,578	13.7	5,868	1,353	676	24.5	568	35.2	4,332	185	780,618	6,384,276
1920	4,914	15,908	20,822	5.5	.....	1,427	702	24.9	1,236	61.9	7,121	184	783,027	6,259,325
Southwestern region:														
Gal., Harrisb'g & S. An..1921	7,512	19,670	27,182	(1)	3,124	1,318	561	28.6	(1)	(1)	4,282	132	176,386	1,260,931
1920	2,075	23,670	25,745	(1)	.....	1,311	614	26.8	(1)	(1)	4,053	124	161,031	1,201,691
Gulf, Colo. & Santa Fe...1921	174	12,990	13,164	4.3	2,803	1,342	584	26.2	390	24.7	2,696	158	176,065	1,012,435
1920	120	15,520	15,640	5.1	.....	1,167	535	23.9	271	15.5	2,192	...	186,032	1,143,591
Missouri Kans. & Tex...1921	8,126	5,182	13,308	8.4	2,978	1,425	568	23.5	317	23.2	2,470	162	259,482	2,041,074
1920	2,844	11,431	14,275	5.6	.....	1,397	568	23.9	377	26.8	3,145	...	285,339	2,092,163
Mo., Kans. & Tex. of Tex...1921	242	12,881	13,123	4.0	1,090	1,128	463	25.7	301	20.3	2,268	177	256,016	1,758,431
1920	217	15,102	15,319	4.3	.....	976	407	23.9	235	15.7	2,005	...	290,652	1,884,462
Missouri Pacific 1921	31,126	22,601	53,727	6.0	3,835	1,230	552	25.7	353	20.8	2,614	176	852,092	5,002,931
1920	10,692	43,871	54,563	3.7	.....	1,295	645	26.7	460	22.5	3,456	...	863,319	5,096,421
St. Louis-San Francisco.....1921	19,581	12,883	32,464	7.4	.....	951	395	24.4	313	20.7	2,134	225	712,538	4,007,513
1920	7,671	28,858	36,529	4.6	.....	1,003	470	25.2	386	21.3	2,963	233	720,424	4,223,645
Texas & Pacific.....1921	4,826	8,486	13,312	11.0	.....	1,189	464	23.2	363	26.0	2,481	171	288,156	1,901,843
1920	2,779	14,830	17,609	7.6	.....	1,050	460	23.1	274	16.2	2,478	213	300,584	2,017,631

(1) Data not available. (2) No passenger service. (3) Separation not available.

International Railway Fuel Association

This association will hold its thirteenth annual meeting at Hotel Sherman, Chicago, on Tuesday, Wednesday and Thursday, May 24, 25 and 26. The program of the meeting shows addresses by Samuel O. Dunn, J. B. Hurley, Eugene McAuliffe and Robert E. Woolley.

The subjects of committee reports, with the name of the chairman of the committee following each subject, are as follows: Constitution and By-Laws, T. D. Smith; Firing Practice, M. A. Daly; Front Ends, Grates and Ash Pans, H. B. MacFarland; Fuel Accounting, J. N. Clark; Fuel Stations, W. E. Dunham; Pulverized Fuel, W. J. Bohan; Storage Coal, H. H. Stock; Locomotive Feed Water Heating, E. E. Chapman; Briquettes and Sub-Normal Fuels, E. E. Ramey.

Nine individual papers are scheduled; these, with their authors, are as follows: Cost of Production of Coal, Mont B. Morrow; Fuel Conditions on French Railways, Mr. de Boysson; Fuel Department Organization, L. G. Plant; Oil Shale as a Source of Oil Supply, Martin J. Gavin; Other Duties of a Fuel Inspector, H. L. Reynard; Preparation and Distribution of Coal, P. E. Bast; Standards of Fuel Economy Practice, D. C. Buell; Fuel Economy, C. E. Uddenberg; Value of Individual Enginemen's Performance Record, Robert Collett.

The Kushequa Route

What may be called a "seasonal" time-table has been issued by the Mt. Jewett, Kinzua & Riterville Railroad, otherwise known as "The Kushequa Route," in northwestern Pennsylvania. The time-table for the coming summer is headed "For Fire Season, 1921"; and beneath the heading it says, "No Trains east of Kushequa on Dry days." The meaning of the word "dry" in this connection is not that which is so familiar nowadays in the humorous columns of the newspapers, but relates to weather conditions. Because of the existence of extensive dense forests adjacent to the railroad line, the danger of fire must constantly be guarded against. Judging from the newspaper accounts which give this information, the five locomotives owned by the road are not equipped with perfectly satisfactory spark arresters.

The total length of this road is about 25 miles (including six leased lines) and that portion east of Kushequa has a length of about 15 miles. One of the features of the road is a locomotive named "Roosevelt," which name was adopted, it is said, because the engine is a rough rider. This railroad is an important one, in that it affords to many residents of McKean County their only convenient means of getting to their county seat, Smethport.

Fire at Grand Central Terminal

The burning out of a positive third rail feeder at 6:30 a. m. Sunday, May 16, at Tower U interlocking Grand Central terminal, threatened to tie up all train movements into and out of the station and in addition caused damage to the interlocking estimated at $20,000. Trouble was first noticed when trick fuses could not be kept in on one track circuit. When an inspection of the track circuit was made a thin line of smoke was noticed curling up from the ballast. Electrical department employees were notified, but before their arrival the feeder burned out and the heavy current discharge was carried through the ground, over pipes, and structural steel work in all directions. It appears that this current was carried into the interlocking tower on the steam heating pipes which, in running to the tower, are buried in ballast at this point. From these pipes the current spread to all metal parts of the tower and the insulation on the wires for all the interlocking and intercommunicating circuits was set on fire and burned fiercely, completely destroying all circuits. The city fire department on arrival completely flooded the tower, adding materially to the damage to the machine and instruments. Tower U is an electric interlocking plant with a 92-working-lever machine, and with the exception of the frame and mechanical locking this had to be stripped and entirely rebuilt by the force who immediately started to work to repair the damage. With a train movement of about 400 trains on Sunday over this plant, the accident resulted in only 653½ minutes of accumulated delay, a large portion of which was caused by the fire department requiring all power to be cut off at this point for about 40 minutes. By 5:35 a. m. Monday, emergency repairs had been made so that all switches and signals needed to handle the heavy inbound suburban and through service were in operation, and with about 625 trains on weekdays, no train delays occurred on Monday.

Signal Section—A. R. A.

The notice of the annual meeting of the Signal Section, American Railway Association, which is to be held at Chicago on June 6, 7 and 8, has just been issued by Secretary H. S. Balliet. It fills 200 pages and contains the full reports of the committees. Committee X presents a report, prepared by a sub-committee, of which H. K. Lowry is chairman, on the requisites of signal locations for automatic block signals. This committee, among other things, reports on automatic train control, and on a proposed short code of requisites for light signals. Specifications to be discussed at the meeting include those for mechanical interlocking, for power interlocking, for a battery jar, for a concrete battery box and for portable ammeters and voltmeters. Twelve proposed standard drawings of details will be presented. Committee IV presents a code of instructions for making torque tests of power-operated signals, and a drawing of torque testing apparatus. Other subjects to be presented are: Rules for signal maintenance; general provisions for use in major specifications; information for calculating power supply and distribution in alternating current signal systems, and forms of contractors' proposal including invitation, bond, and a full contract.

Committee XV on valuation, J. M. Carley, chairman, presents a report of a dozen pages giving the result of studies in valuation details made by several sub-committees.

Chicago Belt Line Hearing Continued

Witnesses called by Luther M. Walter, attorney for the roads, protesting against the acquisition of the Chicago Junction Belt Line by the New York Central, in the hearing before Examiner W. A. Colston of the Interstate Commerce Commission, continued their arguments against the plan this week. John F. Wallace, former chairman of the Chicago Railway Terminals Commission, on May 16, declared that trunk line control of the property would make it less flexible in meeting shippers' requirements, and stated that the opportunity for terminal expansion of the New York Central's present holdings north of Sixty-third street, Chicago, was entirely possible. He also stated that the plan of the city of Chicago for terminal improvement north of Sixteenth street, would give the New York Central a chance for intensive development which would afford it practically four times its present facilities now north of that street.

Other witnesses called to the stand who favored joint operation of the property were Fred Zimmerman, vice-president of the Monon; H. E. Poronto, vice-president of the Chicago Belt Line; and Ira L. Burlingame, president of the St. Louis Freight Service Association and former general manager of the St. Louis Terminal Railroad Association. Mr. Burlingame said: "Shippers are better served by jointly owned belt lines than by one under the control of one line. I have located many industries in St. Louis and the big shippers always desire to be on the joint line. As general manager of the St. Louis Terminal Road, I was not hampered in any way by roads interested in the property. When I wanted money for improvements, I went to the president of the company and I got it. Jointly owned belt lines do not discriminate in favor of any one road."

J. A. Spoor, president of the Chicago Junction, testifying on May 16, declared that of the capital stock of $5,500,000 of the Junction Road, only $200,000 represented actual cash paid into the property by the stockholders. The balance came from earnings placed back into the property.

Abraham Harris, of Harris Brothers, one of the industries situated on the Chicago Junction, who was called to the stand on May 16, was asked by Mr. Walter why he had quit, after starting active opposition to the plan. He finally admitted that heavy financial pressure had been brought to bear on him by big banks.

Traffic News

The National Industrial Traffic League will hold its Spring meeting at Hotel Winton, Cleveland, Ohio, on May 25 and 26.

Five railroads in Missouri have made an offer to country newspaper editors to accept advertising space in return for transportation, in order to help the editors go to the twelfth annual journalism week at the University of Missouri, Columbus, Mo., from May 23 to 27.

Iron and steel producers at Chicago have filed an application with the transcontinental lines for a readjustment of through rates on rolled steel from Chicago to the Pacific Coast, to enable them to compete with the Eastern mills now enjoying low water rates.

The recovery in production of soft coal gained additional momentum in the week ending May 7, according to the weekly bulletin of the Geological Survey. The total output is estimated at 7,296,000 net tons, an increase of nearly 5 per cent when compared with the preceding week.

J. H. Beek, executive secretary of the National Industrial Traffic League, called upon President Harding at the White House on Monday to invite him to speak at the next meeting of the league in Cleveland and incidentally discussed with the President the railroad situation from the point of view of the shippers.

The Louisville & Nashville has announced advances, which it is proposed to put in force on June 16, in freight rates on coal, from mines in various sections, to Louisville, Ky., and to certain other places, at the same time making reductions in rates to Lexington and certain territory. In Louisville, loud threats are made that the Interstate Commerce Commission will be asked to suspend the proposed increases. Some of these rates are intrastate and some interstate. The average freight rate on coal received in Louisville is said to be about $1.25 a ton and the proposed increases average about 15 cents a ton.

The Pacific Railway Club and the Central California Traffic Association held a joint meeting at Oakland, Cal., on May 12, to discuss the topic "Co-operation of Railroad Men with Commercial and Industrial Traffic Managers." C. D. Myers, district freight agent of the Southern Pacific, spoke "On the Value of Solicitation"; G. H. Baker, assistant general freight agent of the Atchison, Topeka & Santa Fe, delivered an address on "Some Phases of the Claim Question"; "High Freight Rates" were discussed by Theodore Harte, assistant general freight agent of the Western Pacific and T. W. Gates, in charge of the tracing reconsignment bureau of the Southern Pacific, spoke on "How Tracing Service May Be Made of Value."

Disturbing a Privilege of Sixty Years' Standing

A move on the part of the Erie Railroad to do away with certain free lighterage privileges in New York Harbor (on all lumber except that in carloads, where cars are set ashore and unloaded by consignee) is interpreted by Brooklyn business men as probably the first step in a program of all the trunk line roads serving that city to economize at the expense of Brooklyn, Queens and other boroughs that depend on free lighterage. The Brooklyn Eagle, commenting on the Erie's notice, and reviewing the history of the lumber trade, says:

"Lighterage of lumber from the New Jersey terminals has been part of the railroad freight service for generations. Six or eight big lumber yards on Newton Creek have been established as receiving points for lumber, largely on the basis of free lighterage. To do away with this lighterage would materially add to the cost of the lumber. The service has been in effect since 1862, when the Erie and the New York Central were compelled by competition of water transportation to make the lighterage part of the rail rate. During the war lighterage was curtailed and in many cases abolished. Cars were scarce, lighters were not available and the lumber supply in Brooklyn was kept down to a minimum. The present move is the boldest that has been made by any road, and it looks like the first move in a general plan to do away with lighterage, except as the consignee wants to pay extra for the service, which would mean adding 4 or 5 cents a hundred pounds. This lighterage service must be maintained as long as our rail connection with the rest of the country is as antiquated as it is."

Anthracite Shipments—April, 1921

The shipments of anthracite in April, as reported to the Anthracite Bureau of Information in Philadelphia, amounted to 5,967,465 tons, an increase over the preceding month of 229,694 tons, and 1,153,254 tons over April last year when the Switchmen's strike was on.

Shipments by originating carriers were:

	April, 1921	March, 1921
P. & R.	1,123,585	1,018,858
L. V.	1,102,965	1,022,714
C. of N. J.	537,822	540,556
D. L. & W.	929,271	1,020,381
D. & H.	812,967	837,644
Penna.	416,847	333,687
Erie	630,471	561,013
N. Y. O. & W.	128,684	144,930
L. & N. E.	284,853	257,988
Total	5,967,465	5,737,771

Fraudulent Claim for Freight Damage

An indictment was returned by the Federal Grand Jury at Chicago, on April 29, against the Lakeside Fish & Oyster Company (a corporation) and Benjamin Sacks, president of that company, for filing a false loss and damage claim against the New York Central, in violation of Section 10 of the Act to Regulate Commerce. The claim was filed in connection with a carload shipment of fish consigned to the Lakeside company. Damage was claimed to the amount of $1,288 based on alleged sale of the fish by the claimant for $301. The indictment charges that the fish were in fact sold for $1,135 and that the claim is false to the extent of the difference between this realization and the alleged realization of $301. The case was developed through an investigation conducted at Chicago by the Interstate Commerce Commission. Benjamin Sacks was arrested on May 3 and his bond was fixed at $5,000. Both defendants were arraigned before Judge Landis on May 6 and entered pleas of not guilty. For the offense charged in the indictment there is a maximum penalty of $5,000 fine for a corporation and $5,000 fine and two years' imprisonment for an individual.

Eighteen Dollars Per Car Mile

An overcharge of $3,000 on 52 carloads of freight moved only a little over six miles, is one of the curious incidents disclosed in a recent report of the Interstate Commerce Commission. The excess collection remained in the hands of the railroad for about a year and a half, thus adding to the overcharge nearly $300 in interest.

In August and September, 1919, the Procter & Gamble Manufacturing Company had 52 tank car loads of silicate of soda shipped from Rahway, N. J., to Port Ivory, Staten Island, N. Y., over the Pennsylvania and the Baltimore & Ohio, 6.4 miles. The rate was fifth-class, 12 cents per 100 lb.; and at this rate the revenue was $113.28 a car, equal to $18.27 per car mile, the average load being 94,400 lb. After about a month the carriers made a special rate of 5.5 cents and the commission rules that that rate was as high as could reasonably be charged on the 52 cars which, apparently, were shipped while the application for a special rate was being considered. At the lower rate the yield per car was $51.92 per car, or $8.37 per car mile. The plant of the shipper at Rahway began operations on August 1, 1919, and application was at once made for a commodity rate, silicate of soda being a raw material of low value. It is used in the manufacture of soap and for coating the inside of oil barrels to make them proof against leakage. Rates of 5.5 cents were shown to be in force in various places for distances much more than six miles.

How long it would have taken for the carrier to grant the low commodity rate if it had not been for the restrictions of the Interstate Commerce law, is not stated.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until September 12, the operation of certain schedules which provide increased rates on naval stores between South Atlantic ports and also between interior points and these ports.

The commission has suspended from May 16 until September 12, the operation of certain schedules which propose the cancellation of the existing through rates on cement from certain points in New Jersey, New York and Pennsylvania to points on the Washington, Baltimore & Annapolis Electric Railway, leaving combination rates applicable instead.

The Interstate Commerce Commission has issued its decision in the Arizona intrastate rate case, which is similar to those in the other state rate cases, finding that the failure of the state authorities to authorize increases in rates corresponding to those authorized for interstate traffic results in discrimination, and ordering an increase of the state rates.

The commission has suspended from May 15 to September 12, the operation of certain schedules proposing to establish a terminal charge of $15 per car, applicable between points in Western trunk line territory, to cover cost of policing shipments of intoxicating liquors while in the hands of the carriers, such charge to be in addition to the line haul rate.

The commission has further suspended until July 1, 1921, the operation of certain schedules which propose to transfer El Paso, Texas, from the eastern boundary of the Mountain-Pacific territory taking 25 per cent increase under Ex Parte 74 decision, over August 25, 1920 rates to the western group, making applicable instead the interterritorial percentage increase of 33⅓ per cent, applicable on transcontinental class and commodity rates between El Paso, Texas, and the Pacific Northwest, the operation of which was suspended until June 1 and 15, 1921, by orders previously entered.

Mississippi Valley Case

The hearing before the Interstate Commerce Commission, involving the Mississippi Valley rate adjustment, which was heard by Examiner E. L. Gaddess in Memphis, beginning April 5, and subsequently transferred to St. Louis, April 25, was concluded in St. Louis on May 6. At the conclusion of the hearing the examiner fixed the time for filing briefs at 30 days from that date, subject to the approval of the commission, in view of the short time intervening before the expiration of the suspension, June 28.

In view of the extent of the record in this case (there being approximately 5,000 pages of testimony taken and over 1,100 exhibits filed, some of which are 70 pages in length), and because of the necessary delay that must follow before the transcript of record will be received by the parties in interest, the commission has now fixed June 25, 1921, as the date for filing briefs.

The argument in the case will be heard by the whole commission in July on a date to be hereafter named. The carriers have agreed voluntarily to postpone the effective date of the tariffs for four months from July 28, and the commission has under consideration the necessary modification of its fourth section orders to permit such postponement.

In view of the magnitude of the adjustment of rates involved and the great mass of testimony and exhibits to be considered, this action was necessary in order to properly adjudicate the matter. Certain commodity schedules were filed so hurriedly that justification thereof is admitted by the carriers to be impossible. Thus rates on cement and asphalt have been withdrawn from the scope of this proceeding. In the case of other schedules, where carriers are willing to file amended schedules, and where the schedules are acceptable to the shippers, such amended schedules may be sent to Examiner Gaddess on or before the date fixed for the filing of briefs; but such schedules so filed must show the agreement of both carriers and shippers thereto.

State Commissions

The Chicago, Rock Island & Pacific filed a protest with the State Public Utilities Commission of Illinois on May 11, at Springfield, Ill., against the use of hard roads by motor bus companies styled as "an appropriation of public improvements to private interest without any compensation." The filing of the protest is a direct objection against the operation of the Peoria White Star Bus Company and the Ivy Way Bus Line, which the railway complains will force it to curtail its service.

Personnel of Commissions

Harley W. Brundige has been elected president of the California Railroad Commission, succeeding Frank R. Devlin, who resigned on May 1. Mr. Brundige was appointed to the railroad commission for a six year term by Governor W. D. Stephens, in January, 1919. At the time of his appointment he was publisher and editor of the Los Angeles Express.

Court News

Yard Tracks and Switch Engines Not Necessarily a Nuisance

The Indiana Appellate Court holds that a railroad's general power under the state statute to erect and maintain all buildings and station facilities necessary for efficient service includes the maintenance of tracks near a station with switch engines thereon ready for immediate use. Where a railroad has been constructed in a district devoted wholly to railroad and manufacturing purposes, those choosing the district for residential purposes do so at their own risk and must take the consequences. They must be held to have anticipated the incidental damages resulting from smoke, gases, fumes, and noises, which must be regarded as *damnum absque injuria;* and a bill to enjoin the maintenance of switch engines with steam up at night as a nuisance will not lie.—Bennett v. Lake Erie & Western (Ind.), 127 N. E. 777.

Hours of Service Act—"Daytime" and "Night and Day" Telegraph Offices

The federal district court, M. D., Pennsylvania, holds that a telegraph office open 15 hours in winter and 16½ hours in summer is not an office "operated only during the daytime" and therefore is a "night and day" office, within the meaning of the Hours of Service Act, and an operator's time on duty is limited to nine consecutive hours in such an office.

The total period of an operator's duties in a daytime office was about 14 hours 20 minutes, but three periods for his meals, ranging from 20 to 50 minutes each, if deducted, would bring his time on duty within the 13-hour limit. It is held that such intermissions allowed for meals should not be deducted from the time of service. They are "trifling interruptions," in the language used in United States v. Atchison, T. & S. F., 220 U. S. 37, 31 Sup. Ct., 362.—United States v. Cornwall & Lebanon, 268 Fed. 680.

Liability for Injury Caused by Defective Brake

A carrier furnishing cars to a shipper is liable for injuries to him or his employee due to a defect in a car which might have been discovered by reasonable care in inspection. If the carrier is negligent in furnishing the car, and the shipper in turn is negligent in furnishing it to hs employee to be loaded, the carrier and shipper are both liable to the injured employee; but the use of a car obviously so defective as to be dangerous would be either assumption of risk or contributory negligence, according to the circumstances, on the part of the person operating it. Applying these rules, the Circuit Court of Appeals, Fourth Circuit, holds that, where there was evidence that the railroad company furnished a car with a brake seriously defective, due to worn shoes, causing excessive slack, knowing that the brake would be depended on to hold the car loaded with coal on a steep grade, and that the defect in the brake was the proximate result of an injury to an employee who tried to

stop the car with a piece of timber, the railroad company would be liable, if nothing else appeared.—Waldron v. Director General of Railroads, 266 Fed. 196.

Coal Car Distribution in Emergencies

The Circuit Court of Appeals, Fourth Circuit, construes the provisions of section 402 of the Transportation Act of February 28, 1920, as to coal car distribution in time of shortage as follows: By subdivision 12 of the section Congress intended to abolish all preference to mines furnishing railroad fuel coal under the assigned car rule in periods of ordinary car shortage. But under subdivision 15, providing that whenever the Interstate Commerce Commission is of opinion that an emergency requiring immediate action exists, it may give directions for preference or priority in transportation, embargoes, or movement of traffic under permits, the commission may suspend the rule prescribed by subdivision 12. When the commission issues an order suspending the rule based on its opinion that an emergency exists it is not within the power of the court to annul the order on the ground that the administrative power conferred on the commission was unwisely or improvidently exercised. Baltimore & Ohio v. Lambert Run Coal Co., 267 Fed. 776. Certiorari denied, 254 U. S.—41 Sup. Ct. 148.

Decisions Under the Federal Employers' Liability Act

The Circuit Court of Appeals, Third Circuit, holds that a person killed while on his way to work upon a crane used for unloading coal cars so as to create a coal reserve to be used in both interstate and intrastate commerce in case of a threatened strike could not recover under the act, the crane not being engaged in interstate commerce.—Kozimo v. Hines, 268 Fed. 507.

The Texas Supreme Court holds that a trucker injured in unloading freight shipped from another state is within the act.—Cox v. St. Louis & San Francisco (Tex.) 222 S. W., 964.

The Arkansas Supreme Court holds that a brakeman employed on a train hauling ballast to be used on the main track of an interstate railroad is within the act.—Kansas City Southern v. Leinen (Ark.), 223 S. W. 1.

The Illinois Appellate Court holds that a pipe fitter, employed by an interstate railroad in repairing an engine on a sidetrack preparatory to its being used to haul a passenger car between states is within the act.—Sheehan v. Wabash, 214 Ill. App., 347.

The Illinois Supreme Court holds that a railroad employee, returning to a station after delivering interstate mail pouches to another carrier for further transmission is still engaged in interstate commerce, so that the state Industrial Commission cannot award compensation for his death while so returning.—Cleveland, C. C. & S. & St. L. v. Industrial Com. (Ill.), 128 N. E., 516.

United States Supreme Court

Rates for Transportation of Soldiers

On several occasions in 1914 and 1915 the Atchison, Topeka & Santa Fe at the request of the United States furnished transportation from one state to another for officers and enlisted men of the United States army. In each instance the tariffs provided a through individual rate from the initial point to destination, and also intermediate rates to and from intermediate points. In no instance was there a through party rate, but in all there was a party rate for a part only of the distance. Except in two instances the transportation was furnished without any prior contract. Bills for the transportation, with appropriate land grant deductions were presented to the accounting officers, who in each bill allowed only a part of what was claimed. The Court of Claims, without opinion, sustained the action of the accounting officers, and the company appealed to the Supreme Court.

The accounting officers proceeded on the theory that the collectible rate should be determined by combining the party rate covering a part of the distance and the individual rate for the remainder. In this the Supreme Court holds the accounting officers erred. By requesting and accepting the service without some special arrangement the United States assented to and became obligated to pay the tariff rate.

The judgment was reversed and the suit remanded to the Court of Claims. Atchison, Topeka & Santa Fe v. United States. Decided April 18, 1921. Opinion by Mr. Justice Van Devanter.

Foreign Railway News

Locomotives and Cars for China

The Peking-Hankow Railway is about to close a contract for 30 locomotives and is in the market for 30 more according to Commercial Attaché Julean Arnold at Peking. He reports further that the Peking-Suiguan expects to purchase 1,000 cars and 74 locomotives. It is understood that the South Manchuria Railway has secured a loan for $600,000 for the construction of a new line from Taonan to Tsenkiatum.

Rolling Stock Repair Companies in Roumania

LONDON.

A group of Roumanian financial institutions with a capital of approximately $7,000,000 (at the present rate of exchange) have made an offer to the Roumanian State Railway Administration to undertake the repairs of the rolling stock of the state railways, since it is thought that the offers from foreign companies to undertake this work are much too high. These financial institutions engage to erect plants capable of repairing 7,000 locomotives within seven years as against 5,000 proposed by the foreign concerns. They undertake also to construct plants capable of repairing within seven years 5,000 passenger cars instead of the 3,000 proposed by the foreign firms and repairing 45,000 freight cars instead of 30,000 as proposed by the foreign companies which offered to undertake the equipment repairs.

English Exports of Railway Supplies

LONDON.

The Board of Trade returns give the value of the railway materials exported from Great Britain during the first two months of the year as follows:

	1921	1920
Locomotives	$4,431,660	$1,911,676
Passenger cars	860,660	858,808
Rails	3,555,716	791,924
Freight cars	3,796,228	1,128,956
Wheels and axles	1,575,388	1,128,956
Tires and axles	1,177,724	821,004
Rail chairs and metal ties	1,438,216	234,268
Miscellaneous track material	2,084,076	1,251,560
Total track material	9,829,680	4,262,776

The weight of rails exported was 33,290 tons for the first two months of the present year as against 11,792 tons for the same period of the year 1920, and of rail chairs and metal ties 14,565 tons as against 2,646 tons a year ago.

English Railway Agreements

LONDON.

The report of the Colwyn Committee appointed by the Ministry of Transport to examine and arrive at some clear interpretation of the various agreements entered into between the government and the railways since 1914, when the government assumed control of the roads, was recently discussed in parliament. It was pointed out that there were three principal agreements under which governmental liabilities arose: (1) By the original agreement the government undertook, in effect, to bear any loss to the railway companies arising from any cause during the period of control; (2) Deferred maintenance was to be made good by the government despite any increase in costs; (3) The railway companies were to receive the difference in the value of any stores in their possession at the end of the period of control and that which would have been the value of those stores at the end of 1914.

It was maintained by some in the House of Commons that by these agreements the railways were greatly relieved from the effects of the war such as no industry nor individual had been. Sir Eric Geddes, Minister of Transport, re-

ferred to the Ministry as the "treasury watch-dog" and stated that during its existence it had challenged some $97,000,000 in claims. He claimed that the Colwyn report had shown a possible liability of some $760,000,000 on the part of the government under the existing agreements but that an agreed liability had been entered upon between the government and the Railway Companies' Association of only $250,000,000, which would be incorporated in the government railway bill to be presented shortly. This payment it was proposed to make in two installments; one at the end of this year and the second at the end of next year.

Railways of India in Great Need of Equipment

Authoritative statements in the Weekly Bulletin of the Department of Trade and Commerce of Canada tell of the dire need of the railways of India for "enormous quantities of all classes of supplies, and without doubt rolling stock more than any other." It is said further that "it would be practically useless for India to increase her production" until the railways are able to handle more traffic. Violent competition for the supply of manufactured material and labor difficulties in England, together with the decreased production during the war, are blamed for the present difficulties. Relatively little equipment is manufactured in India although it is understood that plans are being worked out for increasing the production of railway supplies. In addition to the serious equipment shortage it is said that India is in great need of new lines and other additions and betterments. A loan of $36,450,000 (at par) for the Indian railways was floated in London a few weeks ago so easily that an observer has remarked that the railway authorities probably regret that they did not ask for more.

British Railways in South America Show Increased Earnings

The annual reports of the British operated railways in Argentina, Paraguay and Uruguay for the fiscal year 1920 show that on all the lines except the Northern Extension of the Central Uruguay the net earnings were in excess of those of the previous year, according to Trade Commissioner Brady at Buenos Ayres. While the Northern Extension showed a decrease in net earnings, it was still able to pay dividends of 8 per cent on the capital stock. A compilation of the gross receipts and operating expenses of some of the more important railroads of the southern republics is given in the following table:

Road	Mileage	Gross Receipts	Operating Expenses
Southern (Argentina)	3,792	$46,363,360	$32,080,729
Central Argentine	3,305	47,335,204	32,100,038
Buenos Ayres & Pacific	3,536	39,853,103	27,761,472
Western (Argentina)	1,882	25,535,563	17,744,030
Entre Rios (Argentina)	811	6,008,763	4,407,748
Central Cordoba (Argentina)	1,205	15,143,760	11,775,780
Central Uruguay:			
Northern Extension	185	966,620	446,653
Eastern Extension	311	1,641,635	757,013
Montevideo	474	5,860,063	4,447,114
Paraguay Central	274	1,253,870	738,934

NOTE.—Pounds to dollars at par.

All the lines showed a material increase in freight and passenger traffic. The Central Cordoba announced that the shortage of rolling stock was a limiting factor and that, at the time of reporting, 250,000 tons of goods were at its stations awaiting cars. On the Southern the freight traffic increase was 32 per cent over the previous year. This company paid a total dividend of 7 per cent for the year. The Central Argentine paid 6 per cent on its common and 4½ per cent on its preferred stock. The three lines in Uruguay paid dividends of 7, 8 and 9 per cent on the common stock. The lack of coal makes the fuel problem a serious one for these roads. In the past they have been burning wood, but they are turning to oil now wherever possible. Nearly all the lines have asked for rate increases to care for prospective wage raises and other mounting costs. Wage rates at present range from 40 per cent to 70 per cent higher than the 1914 scale.

Equipment and Supplies

Locomotives

THE NATIONAL RAILWAYS OF MEXICO are inquiring through the locomotive builders for 100 locomotives. Francisco Perez, director general of the National Railways, is now in the United States arranging for the purchase of this equipment.

Freight Cars

THE MONTOUR RAILWAY is inquiring for 200 car bodies of 50-tons capacity.

THE UNITED FRUIT COMPANY, New York, is inquiring for 50, 2 compartment cane cars of 12-tons capacity.

Iron and Steel

The JAPANESE GOVERNMENT has ordered through Takata & Co., New York, 6,000 tons of 60 and 75-lb. rails, including accessories.

Track Specialties

The NEW YORK CENTRAL will receive bids until noon, May 27, for 128,620 square and oval track bolts, manufactured in accordance with New York Central standard plans D-9-A.

Miscellaneous

MITSUI & CO., New York, has ordered 270 sets of Westinghouse air brakes to be used on locomotives, passenger and freight cars, of the Japanese Government Railways.

THE NORFOLK & WESTERN will receive bids until noon, June 1, at Roanoke, Va., for parts for electric apparatus; 5,000 No. 2, B & S gage copper rail bonds; 650 lb. flux rods; 6 clamps for holding bonds; 800,000 gal. creosote oil and 425,000 gal. creosote oil.

THE INTERNATIONAL GENERAL ELECTRIC COMPANY, New York, has been given a contract amounting to about $1,500,000 for switch gear, transformers and other equipment by the Victorian Electricity Commission for development of the coal production near Melbourne, Australia. According to advices from Melbourne, the International Company's figure was about $800,000 below the lowest combination of British sectional bids submitted. No British firm made a single bid for furnishing the material.

Signaling

THE BOSTON ELEVATED has ordered from the Union Switch & Signal Company 68 automatic block signals to be installed on its elevated lines in the Charlestown and Roxbury districts, together with a large quantity of other signaling material, most of which is to take the place of apparatus installed about 20 years ago. The signals are to be three-indication, color-light, and they take the place of electro-pneumatic semaphores. Electro-pneumatic automatic stops will be put in at each block signal and the blocks will be about 1,000 ft. long, thus keeping trains about 2,000 ft. apart. The old apparatus is still doing its duty, but it was desired to shorten the block section and this seemed a suitable time to introduce these improvements. Alternating current apparatus is to be introduced, in place of direct current, and extensive changes are to be made in the interlocking at North station, Tower C. Color-light signals will be introduced here also. Tower D will have a new electro-pneumatic machine, seven levers. Alternating current was introduced at Sullivan Square about three years ago and the interlocking machine then taken out from that station is to be used, with new locking and other improvements, at Tower C.

Supply Trade News

The Industrial Car Manufacturers' Institute has removed its executive office from Pittsburgh, Pa., to 68 William street, New York City.

The Ralston Steel Car Company moved its Chicago offices from 20 East Jackson boulevard to the Fisher building, 343 South Dearborn street, on May 1.

W. F. Robinson, for many years connected with James B. Sipe & Co., Pittsburgh, Pa., has been appointed manager of the railroad sales department of the **Tropical Paint & Oil Company,** Cleveland, Ohio.

The Jones & Laughlin Steel Company, of Pittsburgh, Pa., has purchased 15 acres of ground with a 2,700-ft. frontage on Lake Michigan, just east of the Illinois-Indiana state line near Chicago. This company already owns other land in the Calumet district and it is reported that plans are being made to build a steel plant in that district.

V. Z. Caracristi, until recently a member of the Railway & Industrial Engineers, Inc., has opened consulting offices at 43 Broad street, New York. Mr. Caracristi has been identified with the railway and industrial fields for the last 22 years. He was at one time shop engineer and maintenance supervisor of the Richmond plant of the American Locomotive Company, and later general maintenance supervisor of all the plants of that company. He was associated as designer and constructor of the Union Station, Washington, D. C., and was assistant to the general superintendent of motive power of the Baltimore & Ohio. He was later in the employ of the Wheeling & Lake Erie, where he carried out improvements in the Brewster shops, and shortly after did similar work in the Watervliet shops and Carbondale terminal of the Delaware & Hudson. He also supervised the layout, design and equipment of extensions to the plant of the Lima Locomotive Works, Inc. From 1913 to 1919 Mr. Caracristi was engaged in consulting work for banking interests and during this period devoted considerable effort to development work on the burning of pulverized fuel in suspension. In 1919, with J. E. Muhefeld, he formed the Railway & Industrial Engineers, Inc. Mr. Caracristi will specialize in consulting work in railroad and shop design, operation and betterment.

V. Z. Caracristi

Obituary

George Jesse Foran, for many years manager of the condenser department of the **Worthington Pump & Machinery Corporation,** New York, died on May 12, at his home in New York City. He was born on January 22, 1862, in Boston, Mass., and graduated from the Massachusetts Institute of Technology in May, 1883, in the department of mechanical engineering, with the degree of bachelor of science. The following September, he entered the employ of the Deane Steam Pump Company, Holyoke, Mass., and shortly afterwards was transferred to the Boston office of that company. In November, 1886, he went with the George F. Blake Manufacturing Company, as a salesman and later served also as consulting engineer to the president and treasurer of the Blake company. From 1890 to 1897, he was office manager of the new Blake works at East Cambridge, Mass., also head of the estimating and cost department, later returning to the engineering sales department. The above companies were consolidated with others in 1901, to form the International Steam Pump Company, and Mr. Foran then went to New York, as manager and chief engineer of the condenser department of Henry R. Worthington and the associated companies of the International Steam Pump Company. He continued in that position with the Worthington Pump & Machinery Corporation which succeeded the International Steam Pump Company. Mr. Foran was active in the design of high vacuum apparatus during the entire development of that class of machinery and was at the head of the department at the time of his death. During the war, Mr. Foran served upon the committee for condensing apparatus of the United States shipping board and war industries board and as chairman of the American Engineering service of the Engineering Council, which dealt with all questions of personnel between the various departments of the United States Government and the four national engineering societies.

Trade Publications

WELDING SPECIALTIES.—A small pamphlet has recently been issued by the Transportation Engineering Corporation, 200 Fifth avenue, N. Y., which describes and illustrates a number of the electric arc welding accessories manufactured by this company. The specialties described are welding helmets, goggles, a portable sand blast, a metal electrode holder and various types of coated electrodes.

CONSERVATION.—In a 16-page bulletin the Lyster Chemical Company, New York, presents a brief exposition of the subject of timber preservation with creosote, placing special stress on open tank, brush and spray treatments. Some space is devoted to the properties of creosote and methods of application and photographs are shown of representative structures that have been subjected to treatment.

BLAWFORMS FOR GENERAL CONSTRUCTION.—The Blaw-Knox Company, Pittsburgh, Pa., has recently issued a large size, 52-page, illustrated pamphlet descriptive of the line of forms manufactured by this company for general concrete construction. Among the numerous kinds of forms illustrated and described are various sizes and types for sewer construction, tunnels, subways, heavy walls, piers, fixed and traveling type centers for bridges and others for miscellaneous contruction work.

NARROW GAGE LOCOMOTIVES.—The Burton Engineering & Machinery Company, Cincinnati, Ohio, has issued a new publication describing its line of gasoline and kerosene locomotives for narrow gage hauling systems. The publication is a 16-page illustrated booklet, describing its equipment and presenting information as to its adaptability and scope. Included in the book are tables giving the hauling capacity of the machines on various grades with various train resistances.

CONCRETE HARDENING AND BONDING.—The Livingstone Company, Baltimore, Md., has issued a 12-page folder on its "Livingstone" bonding cement and "Lithotex" concrete hardener. The folder devotes space to the theory and practice of bonding top finishes to concrete bases and contains information relative to its two products together with specifications for its use on new construction and patchwork. This information is supplemented with illustrations of buildings on which it has been applied and also classified lists of users, including railroads.

COAL AND ASH HANDLING SYSTEMS.—Catalogue No. 40, 72 pages, illustrated and descriptive of various types of coal and ash handling systems for boiler houses, has been issued by the R. H. Beaumont Company, Philadelphia, Pa. The text of this booklet is descriptive of the various classes of material handling machinery which this company installs, such as skip hoists, crushers, cable drag scrapers, ash cars, hoppers, larries, bunkers, conveyors. The illustrations show many actual installations as well as plan drawings of the different units and sketches of typical systems.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will shortly accept bids for the construction of the bridge over the Des Moines river near Dumas, Mo., to cost approximately $356,000.

ATCHISON, TOPEKA & SANTA FE.—This company has ordered new electrically operated cinder conveyor equipment from the Roberts & Schaefer Company, Chicago, for installation at Albuquerque, N. M.

ATCHISON, TOPEKA & SANTA FE.—This company is accepting bids for the construction of a second floor extension with dimensions of 24 ft. by 100 ft., to its station and office building at Slaton, Tex.

CHICAGO UNION STATION.—This company, which was noted in the *Railway Age* of May 6 (page 1093), as contemplating the completion of the filled portion of the Polk street viaduct, at Chicago, at a cost of about $12,000, is accepting bids for the work.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of May 6 (page 1093), as contemplating the construction of additions to its roundhouse at Freeport, Ill., is now accepting bids for this work.

ILLINOIS CENTRAL.—This company has awarded a contract to P. A. Shugart and Blythe Brothers, Nevada, Iowa, for grading in connection with the construction of yard facilities at Clingon, Ill. The improvements include the construction of a northbound unit of 14 tracks and a southbound unit of 10 tracks, each of 100 car lengths. The total cost of the work will be $650,000. A contract has been awarded to the Unity Construction Company, St. Louis, Mo., for the construction of a viaduct over McLemore avenue, Memphis, Tenn. The company has also awarded contracts to the Ellington-Miller Company, Chicago, for the construction of subways at Eighth and Fourteenth streets, Fort Dodge, Iowa. The company is accepting bids for the construction of 6 additional yard tracks at Paducah, Ky., at a cost of $225,000. Bids will shortly be accepted for the construction of 8,000 feet of storage tracks at Destrehan, La., and for 11,500 feet of storage tracks at Good Hope, La.

NEW YORK CITY.—The governor of the State of New York has signed a bill requiring the municipal authorities of New York City to begin within two years the construction of a railway tunnel under the Narrows to connect Staten Island with Brooklyn. The new tunnel will provide the Staten Island Rapid Transit, a subsidiary of the Baltimore & Ohio, with a connection in Brooklyn with the New York Connecting and the Long Island. In this manner the roads terminating on the New Jersey side of the Hudson river will be given direct rail connections for freight with Brooklyn and with the New York, New Haven & Hartford and the Long Island. In addition the proposed tunnel will provide rapid transit service for passengers between Staten Island and the rest of New York City.

ST. LOUIS-SOUTHWESTERN.—This company will build a frame passenger and freight station at De Witt, Ark. The dimensions of this building will be 24 ft. by 198 ft. This structure is being erected by the company forces and will cost approximately $20,000. It will replace a station destroyed by fire.

UINTAH RAILWAY.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension of 19.4 miles from the present terminus at Watson, Utah.

UNION PACIFIC.—This company, which was noted in the *Railway Age* of May 13 (page 1144), as accepting bids for the work of lining its Sherman tunnel, near Hermosa, Wyo., with concrete, has awarded the contract for this work to the Utah Construction Company, Ogden, Utah.

UVALDE & NORTHERN.—This company contemplates the construction of a new station and warehouse at Camp Wood, Tex., in addition to stations at Laguna and Kelly Field, Tex.

WABASH.—This company is accepting bids for the construction of a brick or stucco passenger station at Macon, Mo., with dimensions of 122 ft. by 24 ft.

Railway Financial News

ATLANTIC COAST LINE.—*Annual Report.*—The corporate income account for the year 1920 compares as follows:

	1920	1919
Operating revenues (4 months)	$25,304,073	.....
Operating expenses, taxes, etc	22,417,739	.....
Operating income (4 months)	$2,866,334	.....
Standard return (2 months)	1,689,505	.....
Operating income guaranty period (6 months)	5,478,458	.....
Other income	*5,198,486	.....
Gross income	$15,252,783	$14,116,304
Interest, taxes, rentals, etc	7,362,221	6,827,605
Net income	$7,890,562	$7,288,699
Sinking fund, etc	24,935	12,904
Appropriation, physical property	181,471	88,258
Surplus	$7,684,156	$7,187,537

*Includes adjustment of standard return.

The annual report of the Atlantic Coast Line will be reviewed editorially in an early issue.

BOSTON & MAINE.—*Directors Advise Stockholders.*—At a special meeting of the directors in Boston on May 9, it was voted that the following letter be sent to the stockholders:

Certain persons styling themselves the "Boston & Maine Railroad Stockholders' Protective Association," are asking you to sign a paper favoring an investigation of the Boston & Maine under their direction at the expense of the corporation. The directors of the Boston & Maine feel that they should inform you that this movement is entirely without authority from them and does not have their approval.

CHESAPEAKE & OHIO.—*Asks Authority to Pledge Bonds.*—This company has applied to the Interstate Commerce Commission for an order authorizing the authentication and delivery of $8,836,000 of its first lien and improvement, 20 year mortgage bonds and the pledge of $6,274,000 of the bonds as security for a loan from the United States of $5,338,000.

CHICAGO & NORTH WESTERN.—*Equipment Trusts Sold.*—This company has sold to White, Weld & Co. two series of equipment trust 6½ per cent certificates, to be issued under the railroad's equipment trust agreement of 1920.

To provide the cash equity, the first three installments of each of such series are to be canceled, so that the first instalments of the certificates will be payable in the year 1925. Series J will mature annually March 1, 1925 to 1936, inclusive; Series K will mature annually April 1, 1925 to 1935, inclusive. The total of the certificates thus sold is $5,436,000. They are to be secured by locomotives and cars having an approximate total cost of $6,820,000.

CHICAGO, MILWAUKEE & ST. PAUL.—*Stockholders Approve Purchase of C. T. H. & S.*—The stockholders of this road met at Milwaukee, Wis., on May 12, and approved the purchase of the Chicago, Terre Haute & Southeastern, at an assessment of $10 a share.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—*Purchase by C. M. & St. P.*—See Chicago, Milwaukee & St. Paul.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—*Dividend Reduced.*—The extra dividend on the common stock has been reduced from 3½ to 2½ per cent. The regular dividends of 1¼ per cent quarterly on the preferred stock and 3 per cent semi-annually on the common, have been declared.

CUMBERLAND & MANCHESTER.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue $375,000 of 10-year, 6 per cent notes, $125,000 of general mortgage, 10-year, 6 per cent gold bonds and $100,000 of equipment trust 6 per cent notes.

DELAWARE & HUDSON.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

DELAWARE, LACKAWANNA & WESTERN.—*Coal Properties to be Sold.*—A contract for the sale of this company's anthracite coal properties to the Glen Alden Coal Company has been prepared

and will be submitted to the stockholders for approval at a meeting to be held July 21. William W. Inglis, vice-president and manager of the coal mining department of the Lackawanna at Scranton, Pa., has been elected president of the Glen Alden Company. The following notice signed by Mr. Inglis has been sent to the road's stockholders:

The Glen Alden Coal Company has offered The Delaware, Lackawanna & Western Railroad Company the sum of sixty million dollars for its anthracite coal properties, to be paid as per terms of contract of sale, with interest at four per cent. A formal contract of sale has been prepared to be executed upon your approval. The Glen Alden Coal Company is a corporation of the state of Pennsylvania, incorporated in the year 1866. We propose to merge the company with the Diamond Anthracite Coal Company, a Pennsylvania corporation which we also control, and, by action in conformity with the laws of the state of Pennsylvania, increase the number of shares of the capital stock of the merged companies to eight hundred forty-six thousand (846,000) shares, of no par value. We shall offer this stock to the stockholders of The Delaware, Lackawanna & Western Railroad Company of record at the close of business June 15, 1921, on the basis of one share of Glen Alden Company stock for each share of railroad company stock, at five dollars ($5.00) per share, payable on or before August 20, 1921. Arrangements have been made with the Farmers' Loan and Trust Company, of the City of New York, to act as transfer agents of the company, and with the First National Bank of New York to act as registrar of the stock of the company. On or before June 20th next subscription blanks will be mailed to all stockholders of record June 15, 1921, for the number of shares to which they may subscribe, in accordance with the foregoing plan. This company will be operated by officials now employed in the coal mining department of your company, the vice-president and manager of such department having been selected as its president.

DENVER & RIO GRANDE.—*Stockholders Appeal to Senate Committee.*—Arthur M. Wickwire, counsel for the stockholders' protective committee, has made public a letter sent by him to Senator Cummins, chairman of the Senate Committee on Interstate Commerce, which is investigating the railroad situation. Mr. Wickwire states in the letter that the committee which he represents has filed a bill in equity in the United States District Court in Colorado to set aside judicial sale of the Denver & Rio Grande properties to the Western Pacific. His letter, in part, says:

One fundamental difficulty that confronts the country arises from the laxity in the incorporation laws of various states governing the railroads. The stockholders have been subject to great wrongs arising through interlocking directors, and there have been no proper restrictions preventing railroad magnates from engaging in a multiplicity of schemes for their personal enrichment and aggrandizement at the expense not only of the stockholders but also of vast numbers of innocent citizens. The jurisdiction formerly conferred upon the Interstate Commerce Commission gave them no power save to investigate and then to publish their reports of wrongs already consummated, which amounted to nothing more than locking the barn after the horse was stolen.

Recent legislation of Congress has advanced somewhat in the right direction, giving the commission some little supervisory power in advance, and certain phases of the wrongs committed in the case of the Denver & Rio Grande are now forbidden and punishable by fine and imprisonment. But the committee believes that the facts of this Denver & Rio Grande case when fully revealed to you will demonstrate that the present legislation does not go half far enough. The honest, hard-working people of the United States have been plundered long enough and often enough in railroad steals, and they are now looking to Congress to pass laws rendering it impossible for the perpetrators of these gigantic outrages to repeat them.

Appeal to Stockholders for Funds.—The protective committee has issued a call for contributions from the stockholders of 50 cents a share with all new stock deposited. Stockholders who have contributed 20 cents a share are asked to pay the balance of 30 cents. The additional funds are needed to carry on the fight before the courts.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan to this company of $400,000 from the revolving fund for 15 years to assist the company in financing additions and betterments to the amount of $800,000.

GRAND TRUNK.—*Shareholders Vote for Government Control.*—At the meeting of shareholders in London on May 12 it was decided to ratify the agreement between the management and the Canadian government providing for the transfer of the control of the railway to the government this month.

Dominion officials expressed satisfaction with this ratification, which they said would extend the time limit in which the arbitrators could make awards and would make further legislation unnecessary during the present session. Government nominees will supplant the existing board of directors. The shareholders will name a committee to present their case before the board of arbitration.

HOCKING VALLEY.—Annual Report.—The corporate income account for the year ended December 31, 1920 (which includes ten months' operation from March 1, 1920), and comparison with year ended December 31, 1919, is as follows:

	1920	1919
Operating revenues:		
Freight traffic	$12,784,092	.....
Passenger traffic	1,175,118	.....
Total operating revenues	$14,949,529	.....
Operating expenses:		
Maintenance of way and structures	$1,826,197	.....
Maintenance of equipment	5,714,556	.....
Traffic	85,593	.....
Transportation	5,714,248	.....
General	426,662	$73,767
Total operating expenses	$13,764,929	$73,767
Net operating revenue	$1,184,600	$73,767
Railway tax accruals	798,879	108,000
Railway operating income	$384,378	$181,767
Net railway operating income	$1,377,165	$181,767
Compensation under contract with director general of railroads	461,302	2,637,167
Other income	302,423	246,794
Gross income	$2,140,889	$2,702,194
Total deductions	$1,795,093	$1,672,326
*Net income	$345,796	$1,029,868
Dividends, 4 per cent	$439,980	$439,980
		$9,846,075
Old accounts written off, and sundry adjustments	.....	156,921
Balance to credit of profit and loss, December 31, 1920	.....	$9,689,154

*The income account for year 1920 contains no payment or accrual on account of the guaranty by the United States Government for the six months' operations from March 1 to August 31, 1920, under section 209 of the Transportation Act, 1920, as the amount is not yet ascertainable.

The annual report of the Hocking Valley will be reviewed editorially in an early issue.

INTERSTATE RAILROAD.—*Asks Authority to Issue Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell $3,000,000 of capital stock, the proceeds to be used for building and extension.

KANSAS CITY SOUTHERN.—*New Director.*—W. C. Loree, of New York, has been elected a director to succeed John J. Mitchell, of Chicago, who has resigned in compliance with the provisions of the Clayton Act.

LOS ANGELES & SALT LAKE.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to issue at par promissory notes in an aggregate amount of $2,500,000 to meet anticipated requirements during the year 1921 by loans from two of its stockholders, William A. Clark and the Oregon Short Line.

MAINE CENTRAL.—*Asks Authority to Lease Road.*—This company has applied to the Interstate Commerce Commission for approval of a lease of the Belfast & Moosehead Lake as an extension of the lease dated April 27, 1871, which expired on May 10.

MISSOURI, KANSAS & TEXAS OF TEXAS.—*Asks Authority to Issue Equipment Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $450,000 of 6 per cent equipment notes, a first lien on 300 tank cars, and to pledge them with the Secretary of the Treasury as security for a loan of $450,000 to be used in payment for the cars.

MISSOURI PACIFIC.—*Purchase of Little Rock & Argenta.*—The transfer of the Little Rock & Argenta has just been completed after the sale contract which was made last December. The Little Rock & Argenta is an industrial line connecting the Chicago, Rock Island & Pacific and the Missouri Pacific at Little Rock, Ark. The sale price was $50,000.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—*Annual Report.*—The corporate income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Standard return (January and February, 1920, full year 1919)	*$490,236	*$3,182,089
Operating revenues (10 months):		
Freight	$14,306,223	.....
Passenger	4,725,018	.....
Total standard return and operating revenue	$20,908,566	$3,182,089
Operating expenses (10 months):		
Maintenance of way and structures	$4,399,363	.....
Maintenance of equipment	5,171,302	.....

Traffic	582,355	.....
Transportation	9,778,057	.....
General	614,940	62,099
Total operating expenses	$20,611,171	$62,099
Railway tax accruals	527,500	118,869
Total operating income.....Def.	$231,274	$3,001,121
Total non-operating income	†2,912,141	180,431
Gross income	2,680,868	3,181,551
Total deductions from gross income	$1,817,354	$1,391,046
Net income	$863,513	$1,790,505

*The standard return finally fixed by the Interstate Commerce Commission was $3,163,576, instead of $3,182,089 per annum. The amount shown for 1920, therefore, includes return at the correct rate for January and February ($527,263) less $37,027 to adjust the amount of the standard return as originally certified and used in reports for 1918 and 1919, to the correct basis.

†Miscellaneous income, amounting to $2,009,875, includes:

Guaranty under Transportation Act, 1920	$1,581,788
Deficit net railway operating income, guaranty period, to close of August accounts	334,600
Interest at 6 per cent during guaranty period on improvements added January 1, 1918, to March 1, 1920	93,487

The annual report of the Nashville, Chattanooga & St. Louis will be reviewed editorially in an early issue.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $1,000,000 of its consolidated mortgage 5 per cent gold bonds and to sell or repledge all or part thereof as collateral security for short term notes.

READING.—*Company Files Modifications of Segregation Plan.*—Modifications to the Reading dissolution plan were filed in the United States District Court at Philadelphia on May 12, by William Clarke Mason, counsel for the Reading interests. The most important modification is the proposed sale by the Reading company of all its stock in the Reading Coal and Iron Company for $5,600,000, subject to the lien of the general mortgage. This stock will be sold to a corporation to be formed, which will issue 1,400,000 shares of stock without par value, and this can be sold to stockholders of the Reading company, preferred and common, share and share alike, for $2 a share. This is conceded to be an effort to eliminate the controversy that has been waged between these classes of stockholders, many of whom have filed petitions to intervene in the present suit.

The modifications suggested for the court's approval are as follows:

The Reading Company will agree with the coal company that, at or before the maturity of the general mortgage bonds, it will obtain the release of the coal company's property from the lien of the general mortgage and the discharge of the coal company from liability on the general mortgage bonds.

The Reading Company will, subject to the lien of the general mortgage, sell, assign and transfer all its rights, title and interest in and to the stock of the coal company, including the present right to vote and receive dividends thereon, to a new corporation to be formed with appropriate powers, and will agree to save the new corporation and said stock harmless from the lien of the general mortgage, and will agree to obtain, at or before the maturity of the general mortgage, the release of the stock of the coal company from the lien of the general mortgage, and the assignment, transfer and delivery of said stock to the new corporation—all in consideration of the payment by the new corporation to the Reading Company of the sum of $5,600,000 and its agreement to issue its shares to the stockholders of the Reading Company as hereinafter provided.

The new corporation will issue 1,400,000 shares of stock without par value. Such no par value stock will be sold by the new corporation to the stockholders of the Reading Company preferred and common, share and share alike, for $5,600,000, or $2 for each share of Reading stock. Provision will be made for the disposition by the Reading Company of any rights to subscribe which may not be availed of by the Reading stockholders within such period as may be fixed by the court, to the end that the new corporation shall receive the full purchase price of $5,600,000.

There will be embodied in the final decree a permanent injunction against the new corporation exercising its voting power on the stock of the coal company in such a way as to bring about any new revelations between the coal company and the Reading Company of the character complained of in the present suit.

The final decree may provide that if, by reason of default on the general mortgage bonds the trustee, the Central Union Trust Company, shall exercise the right to vote the stock of Reading Coal Company, it shall so exercise that right as not to bring about a unity of management between said coal company and Reading Company.

SOUTHERN PACIFIC.—*Asks Authority to Guarantee Bonds.*—This company has applied to the Interstate Commerce Commission for authority to guarantee the principal and interest of $364,000 of first mortgage 5 per cent bonds of the Houston East & West Texas.

SOUTHERN RAILWAY.—*Dividend Action Deferred.*—The directors, at their monthly meeting on May 12, failed to take action on the regular semi-annual dividend of 2½ per cent on the preferred stock usually paid June 30. This does not mean that the dividend will be omitted; the board may declare a dividend in June.

TOLEDO, ST. LOUIS & WESTERN.—*Authorized to Issue and Pledge Receivers' Certificates.*—The receiver has been authorized by the Interstate Commerce Commission to issue $692,000 of receivers' certificates and to pledge them as security for a loan from the United States.

VALDOSTA, MOULTRIE & WESTERN.—*Right to Dismantle.*—Confirmation of the sale of this road to C. L. Jones and his associates for $87,000 with the right to dismantle the line, was given in an order by the United States Court, Savannah, Ga.

The order stipulates that the process of dismantlement shall not be started before July 15. In the meantime, the control and operation of the railroad shall remain in the hands of Robert P. Murray, receiver, who is authorized to make arrangements for freight movements on the line.

WHEELING & LAKE ERIE.—*Annual Report.*—This company has issued a report covering the years ended December 31, 1918, and December 31, 1919. The report does not give figures for 1920. The corporate income account for 1918 and 1919 based upon "standard return" is as follows:

	1919	1918
Income from lease of road	$1,592,037	$1,592,037
Gross income	1,687,327	1,725,508
Interest on funded debt	979,224	1,022,416
Total deductions from gross income	1,380,691	1,425,212
Net income	$306,636	$300,295

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts: Missouri & Illinois Bridge & Belt, $13,559; New York Connecting, $1,395,000; Lake Superior & Ishpeming, $140,000 Munising, Marquette & Southeastern, $90,000; Kansas City, Mexico & Orient, $250,000; Cambria & Indiana, $70,000; Great Northern, $6,500,000; Texas Midland, $100,000; Duluth, Missabe & Northern, $8,525,000; Duluth & Iron Range, $4,866,000; Gulf, Texas & Western, $40,000; Northern Pacific, $9,000,000; Des Moines Union, $330,000; Bessemer & Lake Erie, $3,050,000; Western Pacific, $4,200,000; Ulster & Delaware, $390,000; Jay Street Terminal, $290,000; Clinton & Oklahoma Western, $75,000. The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the Administration during the 26 months of federal control.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates to railroads for partial payments on account of the six months' guaranty as follows:

Alabama Central	$3,000
Baltimore & Ohio Chicago Terminal	735,000
Chicago, St. Paul, Minneapolis & Omaha	227,000
Chicago, West Pullman & Southern	22,000
Cincinnati, Lebanon & Northern	150,000
Copper Range	150,000
Grand Rapids & Indiana	780,000
Gulf & Ship Island	20,000
Illinois Northern	35,000
Lehigh & Hudson	200,000
Wisconsin & Northern	27,500

Dividends Declared

Alabama Great Southern.—Common, 3 per cent, semi-annually, payable June 29 to holders of record May 3; preferred, 3 per cent, semi-annually, payable August 18 to holders of record July 14.

Chestnut Hill Railroad.—75 cents, quarterly, payable June 4 to holders of record May 21 to June 3.

Cincinnati, New Orleans & Texas Pacific.—Common, 3 per cent, semi-annually; extra 2½ per cent; both payable June 27 to stock of record June 6. Preferred, 1¼ per cent, quarterly, payable June 1 to holders of record May 21.

Cripple Creek Central.—Preferred, 1 per cent, quarterly, payable June 1 to holders of record May 14.

Erie & Pittsburgh.—87½ cents, quarterly, payable June 10 to holders of record May 13.

New Orleans, Texas & Mexico.—1½ per cent, quarterly, payable June 1 to holders of record May 25.

North Pennsylvania.—$1.00, quarterly, payable May 25 to holders of record May 12 to May 19.

Philadelphia, Germantown & Norristown.—$1.50, quarterly, payable June 4 to holders of record May 21 to June 3.

Southern Pacific.—Common, 1½ per cent, quarterly, payable July 1 to holders of record May 31.

Union Pacific.—Common, 2½ per cent, quarterly, payable July 1 to holders of record June 1.

Railway Officers

Executive

George R. Loyall, assistant vice-president of the Southern, has been elected to succeed J. H. Young as president of the Norfolk Southern, effective when Mr. Young assumes his new duties as president of the Denver & Rio Grande.

H. S. Ray, whose promotion to assistant to the president of the Chicago, Rock Island & Pacific, with headquarters at Chicago, was announced in the *Railway Age* of May 13 (page 1149), was born at Griswold, Conn., on July 23, 1869, and entered railroad service in October, 1890, as a clerk in the office of the Rock Island at Philadelphia, Pa. Later in the same year he was made city passenger agent at Philadelphia, and served in this position until 1892, when he was promoted to traveling passenger agent with headquarters at New York. In 1893, he was made assistant city passenger and ticket agent at des Moines, Iowa, where he served until 1895, when he was promoted to district passenger agent, with headquarters at Wichita, Kan. In 1897 he was transferred to Pittsburgh, Pa., and two years later was again transferred to Philadelphia. In 1902, Mr. Ray was promoted to general agent, passenger department, with headquarters at Denver, Colo., and two years later was made general eastern passenger agent, with headquarters at New York. He was promoted to assistant general passenger agent, with headquarters at St. Louis, Mo., in 1906. In 1908 he was transferred to Chicago, and in 1912 he was transferred to Des Moines, Iowa. In February, 1917, he was commissioned captain in the quartermaster reserve corps, and was called into service in April of that year. After serving in the railway transportation division of the quartermaster general's office in Washington, D. C., Captain Ray was ordered overseas, where he was assigned to the general staff of the American Expeditionary Forces, being engaged in working out problems in connection with the evacuation of troops and property from Europe. He was promoted to Major in April, 1918, and to lieutenant-colonel in August of that year. Upon his return from military service, he resumed his position as assistant general passenger agent of the Rock Island with headquarters at Des Moines, and was serving in that capacity at the time of his recent promotion.

H. S. Ray

Financial, Legal and Accounting

William F. Peter, assistant general counsel of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been given additional jurisdiction over all matters pertaining to real estate and taxation, effective May 2, succeeding John W. Mulligan, deceased. The firm of **O'Brien, Stone, Horn & Stringer,** St. Paul, Minn., has been appointed attorney of the Rock Island in Minnesota and South Dakota.

W. A. Northcutt, general attorney of the Louisville & Nashville, with headquarters at Louisville, Ky., has been promoted to general solicitor, with the same headquarters. **Ernest Woodward** has been appointed general attorney, succeeding Mr. Northcutt. **J. H. McChord,** attorney, with headquarters at Louisville, has been promoted to counsel. **Sidney Smith** has been appointed valuation counsel. The promotions and appointments were effective May 1.

Operating

R. King, division superintendent of the Canadian National, Western Lines, with headquarters at Saskatoon, Sask., has been transferred to Calgary, Alta., effective May 1, succeeding T. J. Brown, who has been assigned to other duties.

M. Sawyer, assistant general superintendent of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., has been appointed superintendent of the Olympic division, with headquarters at Port Angeles, Wash., and the position of assistant general superintendent has been abolished. Mr. Sawyer succeeds **A. O. Veitch,** who has been appointed trainmaster with headquarters at St. Maries, Idaho, succeeding **W. E. Cummins,** who has been assigned to other duties. The appointments and changes were effective May 1.

C. E. Lanhan, who has been appointed superintendent of car service of the Gulf, Mobile & Northern and the Meridian & Memphis, with headquarters at Mobile, Ala., was born at Augusta, Ga., on June 17, 1888. He entered railway service in October, 1904, as a clerk on the Mobile, Jackson & Kansas City, now part of the Gulf, Mobile & Northern. In 1906, he entered the service of the Mobile & Ohio, and served successively with that road as clerk, chief per diem clerk, assistant chief clerk to the general superintendent transportation and chief clerk to the car accountant. He returned to the Gulf, Mobile & Northern, in August, 1920, and was serving as assistant chief clerk to the general manager at the time of his recent promotion.

The East and West Iowa divisions of the Chicago & North Western have been consolidated, effective May 8, and are to be known as the Iowa division. Coincident with this consolidation, appointments and changes have been made as follows: **F. F. McCauley,** superintendent of the West Iowa division, with headquarters at Boone, Iowa, has been appointed superintendent of the Iowa division, with the same headquarters. **F. O'Brien,** superintendent of the East Iowa division, with headquarters at Belle Plaine, Iowa, has been appointed superintendent of the Northern Iowa division, with headquarters at Eagle Grove, Iowa. Mr. O'Brien succeeds **S. A. Morrison,** who has been appointed assistant superintendent of the Wisconsin division, with headquarters at Milwaukee, Wis. Mr. Morrison succeeds **P. G. Campbell,** who has been transferred to the Galena division, with headquarters at Chicago, succeeding **J. J. Burns,** who has been transferred to the Dakota division, with headquarters at Huron, S. D. Mr. Burns succeeds **C. E. Sainsbury,** who has been appointed trainmaster of the Dakota division, with the same headquarters. Mr. Sainsbury succeeds **P. F. Braden,** who has been appointed chief dispatcher of the Dakota division, with the same headquarters. Mr. Braden succeeds **L. B. Kendall,** who has been assigned to other duties. **E. L. Henry** has been appointed trainmaster of the Sioux City division, with headquarters at Wall Lake, Iowa, succeeding **H. J. Ewing,** who has been transferred to the Southern Illinois division, with headquarters at South Pekin, Ill. Mr. Ewing succeeds **C. L. Strom,** who has been appointed chief dispatcher of the Southern Illinois division, with the same headquarters, succeeding **I. B. Sherman,** who has been assigned to other duties.

Traffic

D. P. Skinner has been appointed western dairy agent of the Merchants Dispatch Dairy Line, with headquarters at Chicago, succeeding George B. Horr, deceased.

F. W. Sedgwick has been appointed general agent of the Southern Pacific, with headquarters at Denver, Colo., succeeding **L. B. Banks,** who has been transferred to Kansas City, Mo.

C. C. Gardner, general agent, passenger department, of the Chicago Rock Island & Pacific, with headquarters at Detroit, Mich., has been transferred to Des Moines, Iowa, succeeding

H. S. Ray, who has been promoted to assistant to the president. **P. W. Johnston,** district passenger agent, with headquarters at Wichita, Kan., has been appointed general agent, passenger department, with headquarters at Detroit, Mich., succeeding Mr. Gardner. **O. Collins,** traveling passenger agent, with headquarters at Oklahoma City, Okla., has been promoted to district passenger agent, succeeding Mr. Johnston. These appointments and promotions were effective May 1.

Engineering, Maintenance of Way and Signaling

D. M. Lamdin, division engineer of the Atlantic Coast Line with headquarters at Waycross, Ga., has been appointed engineer of construction, effective May 11, succeeding C. M. James, resigned.

W. J. Foster, regional engineer of the Erie with headquarters at Hornell, N. Y., has been appointed division engineer with headquarters at Buffalo. The office of regional engineer at Hornell has been abolished. **F. S. Wheeler,** division engineer with headquarters at Buffalo, has been transferred to Salamanca, N. Y., succeeding C. A. Daley, who has been assigned to other duties with the same headquarters.

W. S. Hanley, whose appointment as chief engineer of the St. Louis Southwestern, with headquarters at Tyler, Tex., was announced in the *Railway Age* of May 13 (page 1150), was born at Terre Haute, Ind., on September 9, 1877. He was educated at Rose Polytechnic Institute, and entered railroad service in 1902, as an assistant in the engineering corps, of the Pennsylvania, being assigned to the Logansport division. In 1905, he was appointed assistant division engineer of the Chicago & Eastern Illinois, with headquarters at Danville, Ill., and was later promoted to principal assistant engineer, with headquarters at Chicago. In 1912, he was appointed chief engineer of the New Orleans Great Northern, and was serving in that position, with headquarters at Bogalusa, La., at the time of his recent appointment.

C. R. Mee, whose appointment as chief engineer of the Louisiana Railway & Navigation, with headquarters at Shreveport, La., was announced in the *Railway Age* of April 22 (page 1012), was born at Post Oak Springs, Tenn., on August 1, 1880, and entered railroad service in 1898 as an axe-man on the Tennessee Central. In 1900 he entered the service of the Lake Erie, Alliance & Western, as assistant to the resident engineer, and in 1901 he went with the Pittsburgh, McKeesport & Youghiogheny as a transitman on location. Later in the same year he was appointed assistant to the division engineer on the Wabash, and served in that position until February, 1903, when he was appointed locating engineer of the Louisiana Railway & Navigation Company. He was promoted to general roadmaster in 1908, and served in that capacity until December, 1918, during part of which time he was assigned also the duties of chief engineer. On the latter date he left railroad service to take up private engineering practice, and was engaged in this work until he returned to the service of the road, as above noted.

Purchasing and Stores

J. E. Mahaney, general storekeeper of the Seaboard Air Line, has been appointed superintendent of stores of the Chesapeake & Ohio with headquarters at Huntington, W. Va., effective May 1.

R. M. Nelson, purchasing agent of the Chesapeake & Ohio, has been appointed assistant to the director of purchases and stores with headquarters at Richmond, Va., effective April 10. The position of purchasing agent has been abolished.

W. H. King, Jr., whose appointment as general purchasing agent of the Seaboard Air Line was announced in the *Railway Age* of April 29 (page 1056), was born on April 20, 1883, at Portsmouth, Va. His education was continued through high school and preparatory school. In 1900 he entered railway service with the Seaboard Air Line as a clerk in the accounting department. Two years later he became a clerk in one of the company's agencies and the following year became a clerk and statistician in the accounting department. In 1910 he was appointed assistant statistician in the operating department and, in 1912, chief statistician and fuel agent. He was promoted to chief statistician in 1913 and four years later became the assistant to the president and federal manager and also general manager of subsidiary lines. He was appointed assistant to the vice-president, and vice-president of the Baltimore Steam Packet Company in 1920, which position he held at the time of his recent appointment.

Obituary

L. H. Korty, former superintendent of telegraph of the Union Pacific, died at his home in Omaha, Neb., on May 15. Mr. Korty was born at Hanover, Germany, on October 22, 1846, and entered railway service in 1862, as an operator on the Chicago & North Western at Minnesota Junction, Wis. After serving from 1863 to 1866, in the military telegraph service of the United States, and from 1867 to 1869 as an operator with the Western Union Telegraph Company, Mr. Korty entered the service of the Union Pacific. He was appointed superintendent of telegraph in 1887, and retired from active railroad service in 1908.

Robert C. Perkins, former general freight agent of the Illinois Central, died at Covington, Ky., on Friday, May 6. Mr. Perkins was born on March 20, 1857, near Brookhaven, Miss., and entered railway service in 1880, as a waybill clerk on the St. Louis, Alton & Terre Haute at St. Louis, Mo. Two years later he was made claim agent of that road and served in that capacity until 1884, when he was appointed superintendent of the St. Louis Weighing Association. In 1886, he was appointed traveling freight agent of the Mobile & Ohio and a year later was promoted to general agent, with headquarters at New Orleans, La. He entered the service of the Illinois Central on May 1, 1901, as division freight agent, with headquarters at New Orleans, and was promoted to general freight agent with the same headquarters, on January 1, 1905. Mr. Perkins retired from active railroad service on December 31, 1919, on account of ill-health.

William Henry Davisson, assistant district engineer, Bureau of Valuation, Interstate Commerce Commission, with office at San Francisco, died at his home in Oakland, Cal., on May 3, at the age of 58. He was born in Kalamazoo, Mich., and was educated at Griswold College, Davenport, Iowa. He began his railroad service on the Chicago, Rock Island & Pacific, in 1884, as chainman. From 1896 to 1900 he was general roadmaster and in 1906 he was appointed assistant chief engineer. A year later he went to the Chicago, Milwaukee & St. Paul, where he was in charge of construction on the Puget Sound extension, in Montana. In 1910 he was principal engineer on the construction of that part of the present Union Pacific System which lies between Ayer Junction, Wash., and Spokane. He remained here until the work was completed, and in January, 1914, entered the employ of the Interstate Commerce Commission, in charge of roadway inventories in the Pacific district.

Franklin K. Lane, LL. D., Secretary of the Interior in the administration of President Wilson and for eight years a member of the Interstate Commerce Commission, died at Rochester, Minn., on May 18, at the age of 56. He had gone to Rochester for a surgical operation, from which he rallied; but he died later of angina pectoris. Mr. Lane was born near Charlottetown, Prince Edward's Island; but passed his early life in California, engaged in journalism and the practice of law. He was an Interstate Commerce Commissioner from 1905 to 1913, when he resigned to enter the cabinet. In 1918 he was chairman of the railroad wage commission. In all of his public offices he was a genuine statesman, while he was a man with broad, human sympathies and a facile power to express them. He lifted his cabinet office from one of relatively minor importance to one of the first rank. During the war his patriotic services were notable, especially in connection with the Liberty Loans; and after the war he was energetic and original in works of relief and restoration.